

The Iron Age

A Review of the Hardware and Metal Trades.

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The Neville Furnace.

No thoughtful man at all interested in the subject will deny that the original "direct" process of producing iron from the crude structures of the middle ages has offered far more opportunities for improvement than the elimination of iron or steel from the pig since the later introduction of the blast furnace; and yet among the thousand and one economies introduced in iron manufacture, the really simpler

the bars are, however, very small; but it is a remarkable fact that on so small a scale iron of the very highest quality can be made and sold at half the price of English bars made on the largest scale, with all the advantages of modern machinery and appliances. The superiority of iron "directly" produced is well known. Its greater tenacity and welding properties, least oxidation, and availability for the production of the best qualities of steel, give a constant demand, at extreme prices, greater than the supply, and offers to the producer the largest margins known in the trade, and any practical advance in a furnace of this class, with its claims proved by actual test, will have no necessity to wait long for sponsors.

The originators of the furnace we illustrate have spent several years of patient investigation,

producing strong heat can be employed—pine knots, charcoal, hard dried wood, or uncoked bituminous or anthracite coal—all the operations being conducted by the gases of combustion, the fuel itself being at no time in contact with either the ores or the iron, while the puddling part of the process removes in the slag much of the sulphur and phosphorus native to the gangue.

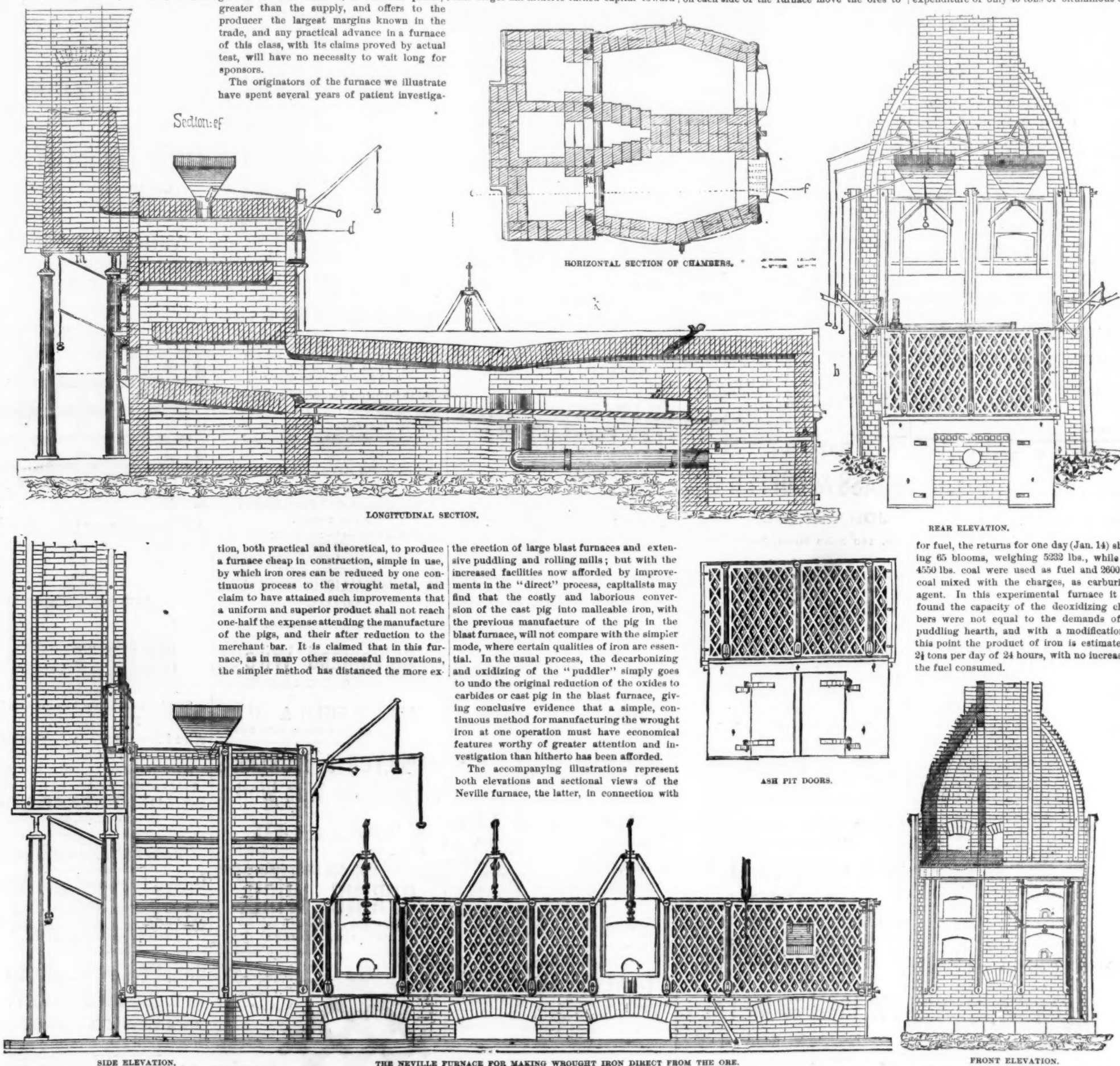
The larger gross profit over the small mountain forges has hitherto turned capital toward

hearth, where any particles that may have escaped deoxidation are acted upon by the stronger flame, and complete preparation insured. As each chamber is emptied a fresh charge is brought down from the upper hearth, or hoppers, so that the operation becomes continuous.

From this lower preparatory hearth, fronting the puddling hearth, the glowing ores are drawn for reduction to wrought iron, and the helpers on each side of the furnace move the ores to

be easily controlled and understood, for in this furnace it is not essential that the most experienced puddlers be employed; indeed, the furnace has been successfully run with ordinary laborers, puddlers' helpers only being in charge.

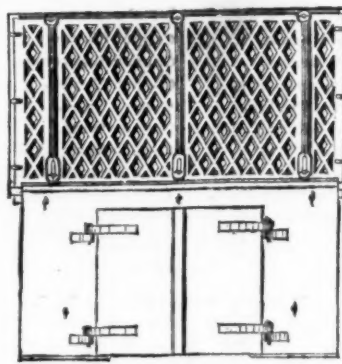
This furnace was on exhibition near this city last January, being in blast 23½ working days, fires being drawn Sundays, during which time 1227 blooms were produced from Champlain and Jersey ores, weighing 92,331 lbs., with an expenditure of only 46 tons of bituminous coal



tion, both practical and theoretical, to produce a furnace cheap in construction, simple in use, by which iron ores can be reduced by one continuous process to the wrought metal, and claim to have attained such improvements that a uniform and superior product shall not reach one-half the expense attending the manufacture of the pigs, and their after reduction to the merchant bar. It is claimed that in this furnace, as in many other successful innovations, the simpler method has distanced the more ex-

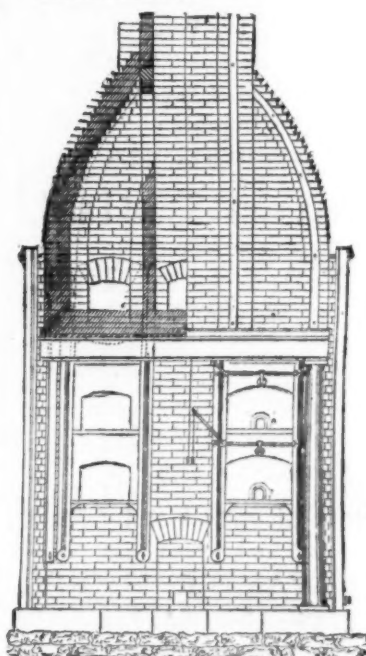
the erection of large blast furnaces and extensive puddling and rolling mills; but with the increased facilities now afforded by improvements in the "direct" process, capitalists may find that the costly and laborious conversion of the cast pig into malleable iron, with the previous manufacture of the pig in the blast furnace, will not compare with the simpler mode, where certain qualities of iron are essential. In the usual process, the decarbonizing and oxidizing of the "puddler" simply goes to undo the original reduction of the oxides to carbides or cast pig in the blast furnace, giving conclusive evidence that a simple, continuous method for manufacturing the wrought iron at one operation must have economical features worthy of greater attention and investigation than hitherto has been afforded.

The accompanying illustrations represent both elevations and sectional views of the Neville furnace, the latter, in connection with



ASH PIT DOORS.

for fuel, the returns for one day (Jan. 14) showing 65 blooms, weighing 5232 lbs., while but 4550 lbs. coal were used as fuel and 2600 lbs. coal mixed with the charges, as carburizing agent. In this experimental furnace it was found the capacity of the deoxidizing chambers were not equal to the demands of the puddling hearth, and with a modification in this point the product of iron is estimated at 2½ tons per day of 24 hours, with no increase in the fuel consumed.



FRONT ELEVATION.

obstacles in the parent process seem to have hitherto defied the spasmodic and irregular efforts of inventors, there always having been a "something" that intervened between the theoretical and actual value of the "improvement." At a late meeting of the Manchester Philosophical Society, Mr. Brockbank, F. G. S., exhibited specimens of iron manufactured by the old Bohemian process from hematite ores in the South of Europe. Similar iron has also recently been sent to England from Japan, the high prices now ruling having attracted supplies of iron from distant countries. The specimens exhibited cost only £2 per ton for the bloom and £3 per ton for the finished bar. The sizes of

pensive and complicated rivals, and that in a few hours the raw ores, having passed the roasting, deoxidizing, carburizing, decarbonizing and reduction stages, under the exact regulation and control afforded by the construction of the "Neville," results in merchantable wrought iron of superior quality, at a price never exceeding good pig metal in the same district. In comparison with the "blooming," or "forge," there are the elements of uniformity of product, increase of yield and economy of fuel in its favor; and while in the "forge" only charcoal is burned, and the purest coal, coke or charcoal in the blast furnace, the Neville furnace claims the important advantage that any fuel capable of

our description, showing clearly the process of manufacture.

The ores, first crushed fine and mixed with their proportion of flux and carbonaceous material, are deposited in the hoppers, and discharged into the upper, retorts, or roasting hearths, of which hearths there are two series of three each. If much sulphur is present there is an arrangement in this hearth for injecting steam for desulphurizing purposes. After a thorough roasting the charge is raked forward so as to fall into the second or middle chamber, and spread evenly to the action of the heated gases; when deoxidized and carbonized it is moved down to the lower inclined

ward the puddler, who balls the iron near the bridge wall end, bringing out two, three and four balls for the hammer every forty or fifty minutes, that will average 100 lbs. each.

By means of the dampers at the junction of the upper hearth chamber and stack, the heat can be modified to any extent in either series of chambers, or the entire gaseous products passed direct to the stack without entering the deoxidizing hearths, this perfect control of the direction of heat being an invaluable constituent of the process. It will also be noticed that the arrangement of dampers and blast regulator shows at a glance the relative areas of each in use, so that the proper working of the charges can

We are informed the iron rolled from these blooms is of superior quality and great tenacity, being neither cold nor red short. Samples can be seen, or any further particulars given, at the office of the Neville Ore Smelting Company, 52 Broadway, this city. The company claim that their furnace and plant is the cheapest before the public, and offer low royalty terms to parties desiring to engage in this branch of iron manufacture.

The Indianapolis Rolling Mill Company lately closed a contract with the Peru road, binding itself to re-roll 2000 tons of rails for that road in the next four months.

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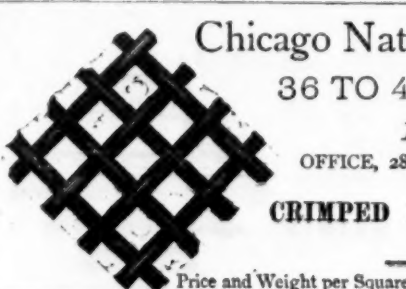
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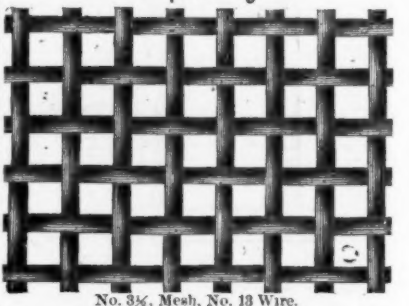
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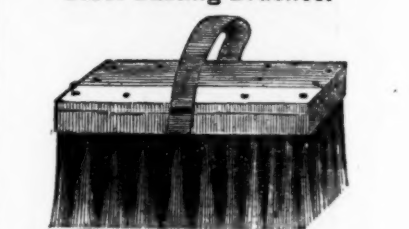
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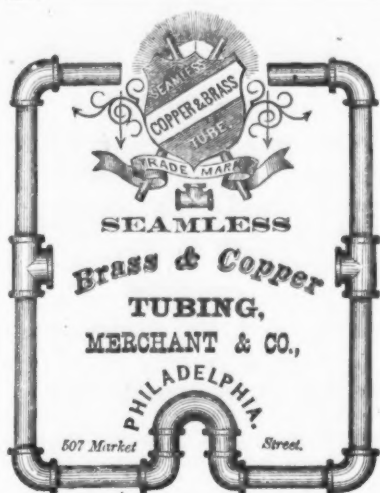
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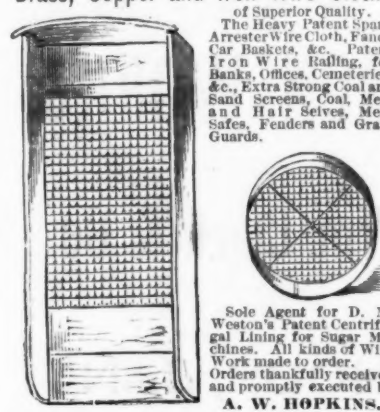
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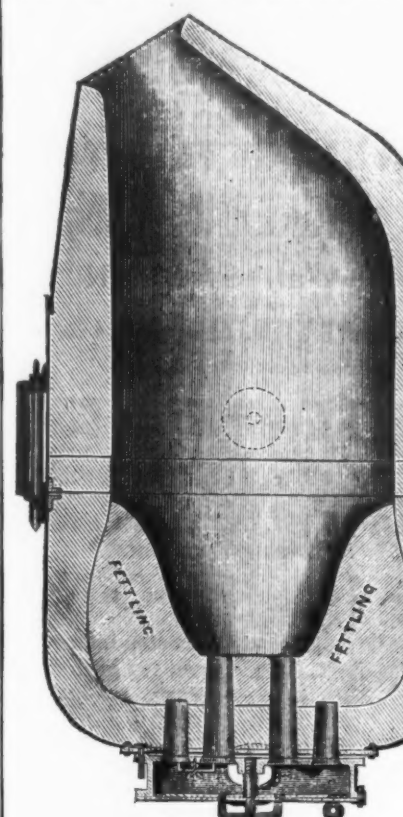
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Rochussen and Daalen's Process for Producing Steel Direct from the Ore.

Messrs. Rochussen and Daalen have been
granted English letters patent on a process for
producing steel direct from the ore, which is
well spoken of. The object of the invention is, in
addition to the ordinary converting of molten
iron into steel, to produce cast steel direct from
the ore, effecting a larger yield of metal from a
Bessemer converter from each charge of molten
iron treated in it, combined with a considerable
saving of blast power, so that eight tons of
steel may be made at a cost of blowing not ex-
ceeding that now required for five tons. In the
Bessemer process the heat yielded by the com-
bustion of matter contained in the iron, such as
carbon, silicon, &c., serves to increase the tem-
perature of the bath and to keep the same



IMPROVED BESSEMER CONVERTER.

liquid, and as the combustion of the gases—
more especially carbonic oxide—mostly takes
place only after they have left the bath, a large
proportion of heat necessarily escapes unused.
This heat could still be utilized for the melting
of iron, which would be added to the steel bath
if it were possible to burn the gases within the
steel bath, but this is prevented, inasmuch as
the oxidation of the carbon takes place in an
indirect manner. At first sesquioxide of iron is
formed, which gives its oxygen to the carbon,
producing, not carbonic acid, but carbonic oxide.

As this process takes place upon the surface
of the steel bath, the combustion of the carbon-
ic oxide does not take place until it has left the
bath, whereas if generated at the bottom of the
bath combustion within would be possible.

In Danks' puddling furnace the generation of
carbonic oxide takes place at the bottom of the
iron bath, and this gas would, by burning with-
in, be turned into carbonic acid if air were in-
troduced. This, therefore, can be done in the
converting furnace if its bottom and sides are
lined with ore, as in Danks' puddling furnace.
The melting ore, when covered by liquid iron,
will then cause immediate oxidation of the car-
bon of the cast iron, and the admission of air
must be regulated so that there is sufficient
oxygen for the combustion of the carbonic oxide
and silicon.

As the generation of carbonic oxide will not
be very rapid in the beginning, and a high pres-
sure of air being required in order to obtain a
quick combustion of the silicon, it will be
necessary at first to work with a smaller section
of tuyere, and to increase it only when, owing
to a growing temperature, the generation of gas
has become more active. It then becomes neces-
sary to introduce sufficient air in order to burn
all the carbonic oxide in the bath. By this
means the bath is heated to a far greater extent
than is the case in the present Bessemer process;
for not only is the carbonic oxide burnt within
the bath, but also the escape of free oxygen, as
it now takes place in the first period, and where-
by a great deal of heat is carried off unused, is
prevented. This loss of heat results from the
circumstance that in the first period silicon
almost exclusively is burnt, whereby only the
necessary temperature is obtained for commencing
the above mentioned processes; since, however,
as before said, a large air pressure is
necessary to oxidize the silicon, a portion
of the oxygen escapes unused because the
tuyere section is too large for the first period.
Although now in the above mentioned pro-
cess of lining the Bessemer converter with ore,
a diminution of the quantity of air is involved,
which generates the heat in the liquid iron, a
higher temperature will nevertheless be pro-
duced in the bath than is the case in the present
process, because the combustion, as shown,
takes place within the mass of iron and not at
the surface of the bath. This method will be
of particular advantage where the iron is taken
direct from the blast furnaces, because this
iron will naturally be hotter than that which
has been melted in the cupola furnace, and be-
cause it has not lost any of its silicon.

The object of the new process is to employ
the surplus of heat for the reduction and melt-
ing of ore in the Bessemer converter, and by the
manner of arranging the ore in the converter to
regulate the quantity of air requisite in the dif-

ferent periods, so that no waste of heat will be
possible, there being, according to the propor-
tion of combustible gases contained in the bath,
also oxygen for combustion; the heat, there-
fore, being produced within the bath and not
without.

To attain this object, the bottom of the con-
verter is lined with ore, as shown in the engrav-
ing. The ore has previously been reduced to
small pieces and mixed with some binding
material so as to form a plastic mass. The
outer tuyeres are covered by the layer of ore,
and are, therefore, blocked at the commence-
ment of the process, but will be opened after
the iron bath has reduced and melted the ore;
in the second period, therefore, sufficient air
will be available to burn the gases generated in
large quantities; whereas, at the beginning of
the process, only little air, but with great pres-
sure, and previously heated if neces-
sary, is introduced.

By this process, accompanied with
the ordinary Bessemer process, two
great advantages are claimed to be
obtained: First, it will be possible
to turn a large quantity of ore di-
rect into steel in the Bessemer con-
verter; and, secondly, a considerable
saving of blowing power will be ef-
fected, the oxygen required for the
combustion of the carbon, silicon,
&c., contained in the iron, being de-
rived in a large measure from the
iron ore.

In order that the iron ore fettling
of the converter may be renewed
without difficulty, the converter is so
constructed that the bottom part
with wind box up to the ring may be
taken off.

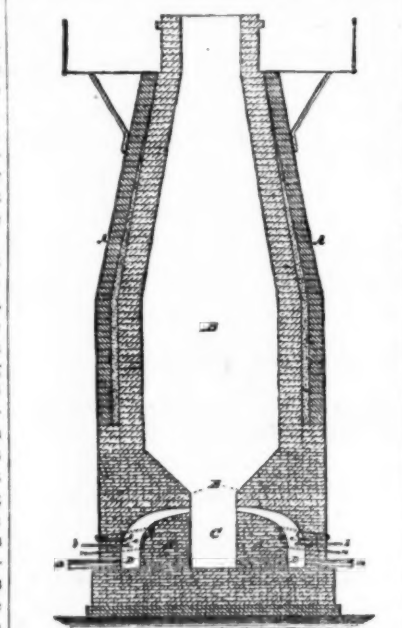
New Patents.

We take from the records of the
patent office at Washington the fol-
lowing specifications of certain pa-
tents lately issued, which will be found
interesting:

IMPROVEMENT IN BLAST FURNACES.
Specification forming part of Let-
ters Patent No. 137,884, dated April
15, 1873, issued to James G. Blunt, of
Leavenworth, Kansas.

This invention relates to blast fur-
naces for the reduction of iron ore
and other metalliferous substances;
and it consists in the construction
and novel arrangement of devices
whereby the vapor of petroleum or
fixed carbon gas, either by itself or in com-
bination with hydrogen (or superheated steam),
is applied as fuel in such furnaces.
The object of this invention is to facilitate
the smelting of iron ore by lessening the ex-
penditure for fuel and the time required
for its manipulation; also, in the cost in
the construction of the furnace, from its less
height and diameter, as in ordinary furnaces;
and, also, to prevent at all times scaffolding or
chilling, and allowing the operation of the fur-
nace to cease at will. It is further designed—
by the use of petroleum vapors and the gases
used as fuel, before described—to more per-
fectly free the iron from sulphur and other im-
purities, and rendering the iron produced of
superior quality and of greater value.

It is well known that ordinary blast furnaces,
using stone coal or charcoal as fuel as a reduc-



IMPROVED BLAST FURNACE.—Fig. 1.

ing agent, are at all times liable to chill from
the imperfect combustion of the fuel, and thus
prevent the blast from passing through the
mass of ore, flux, and fuel, and render the fur-
nace useless until the charge is removed; but
by the use of this petroleum vapor as fuel the
operation can at any time cease without detri-
ment to the furnace, owing to the fact that the
perfect combustion of the reducing agent takes
place at the bottom of the furnace, and in di-
rect contact with the ore and flux.

Figure 1 represents a vertical section of the
blast furnace, showing interior arrangement of
furnace and connections. Fig. 2 represents a
plan, showing the combustion chamber, burn-
ers, superheated steam pipes, together with the
sole or hearth.

Similar letters of reference in the several fig-
ures indicate corresponding parts.
In the accompanying drawing, letter A re-
presents the wall of the furnace. Letter B re-
presents the stack or ore chamber, below which
is located the hearth or receptacle for the
melted ore C. Communicating with the hearth

near its upper portion, and below the lower
portion of the ore chamber or bosh of the fur-
nace, are one or more combustion chambers or
flues, D, which extend upward and inward in
curve form through the lower and thicker por-
tion of the furnace wall A, in such a manner
that while the lower ends are vertical, or near-
ly so, the upper ends are directly upward and
inward toward the opening E in the base of
the ore chamber. Each combustion chamber
is thus divided from the hearth C by a parti-
tion of the furnace wall A. The tuyeres, for
the introduction of the air blast at the lower
and outer portion of the combustion chamber,
are indicated by a. Above each blast opening
the gas pipe b extends through the wall of the
furnace, and is furnished with a cross head, c,
provided with a suitable number of jets or
burners, e.

Hydrogen, in the form of superheated steam,
is designed to be united with the petroleum or
hydrocarbon vapor at the point of ignition in
the following manner: A steam pipe, n, is
passed through the furnace wall to the parti-
tion A between said combustion chamber and
the hearth C. After reaching this partition
wall it is made to traverse the same back and
forth, forming a number of longitudinal folds
or convolutions, as at n', extending upward
upon this partition wall for some distance, when
it is passed back through the furnace wall, and
again returned to the combustion chamber D,
and terminates in a series of jets, z, just above
the vapor burners.

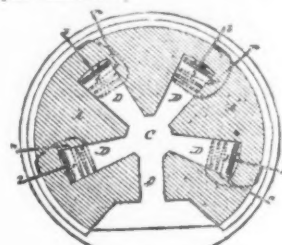


Fig. 2.

The operation of this furnace is as follows:
The ore and flux are first broken into conve-
nient size, and in this condition is fed into the
furnace in the usual manner until it is nearly
full; and when thus charged the valves lead-
ing the hydrocarbon vapors into the furnace
are turned on and ignited. The valve con-
nected with the blowing apparatus is also
turned into the tuyeres. The hydrocarbon
vapors and air are allowed to combine or mix
in the combustion chamber D, thence passing
into the upper part of hearth C, and coming in
direct contact with the ore in the lower part
of ore chamber E, the effect of which is to re-
duce the ore contained in the furnace, and,
when in a molten state, pass down to the
hearth in the ordinary manner.

In some cases it is necessary to use a jet of
superheated steam to aid in the reduction of
some classes of ore; and when this is used the
ordinary steam passes into the superheater, and
thence into the furnace, regulated by a valve.
As the ore is reduced to a molten state, and the
hearth or sole becomes full, it is drawn off in
the usual manner, and fresh charges of ore and
flux charged in at the throat of furnace, and
the operation is continuous.

By the use of this hydrocarbon vapor, an in-
tense heat is generated, and in such a state of
purity as to entirely decompose, evolve, and
eliminate all impurities in the ore, which are
carried off in form of vapor, the scoria or slag
containing but a trace of the impurities origi-
nally contained in the ore.

The hydrocarbon vapor used in this furnace
is generated from petroleum or any other hydro-
carbon, by the use of superheated steam, in
any apparatus used for that purpose, and con-
veyed to the furnace in a suitable manner.
The steam is taken from any ordinary boiler
used for that purpose, and the air is supplied
by any available apparatus.

Claim.—1. The combustion chamber D, in
combination with the stack B, the bosh E, and
hearth C.

2. The superheater n, in combination with
the combustion chamber D, the gas pipe b, and
tuyeres a, substantially as described.

**IMPROVEMENT IN COMPOUNDS FOR LINING BOT-
TOMS OF BESSEMER OR KELLY CONVERTERS.**
Specification forming part of Letters Patent
No. 138,780, dated May 13, 1873, issued to James
E. Atwood, of Pittsburgh.

This invention relates to compounds of refrac-
tory nature employed in lining the bottoms of
converters used in the manufacture of Bessemer
steel, commonly called "Bessemer convert-
ers." The compounds heretofore used for the
bottoms of converters will last on an average of
from three to five heats, when it becomes neces-
sary to reline the bottom at the expense of
time and labor, as the converter must be al-
lowed to cool off before being relined. The in-
vention consists, therefore, in combining a car-
bon—preferably plumbago in the form of old
crucibles, although anthracite or bituminous
coal may furnish the carbon—German or other
plastic clay, old ground fire-brick, Mount Savage
stone clay, and burnt or unburnt sand, which,
when ground together and dampened, so as to
be tamped into the mold, will form a lining that
will run from 12 to 24 heats, or, as it is techni-
cally termed, "blows."

The proportions found to answer best are:
Plumbago in the form of old crucible (or the
coals above named), 30 parts; German clay, 30
parts; ground fire-brick, 30 parts; Mount Savage
stone-clay, 10 parts; common sharp sand, 10
parts. These are ground together and damp-
ened with sufficient water to form a mass that
can be tamped into the mold which forms the
bottom of the converter. New plumbago may
be employed instead of plumbago in the form of
old crucibles; but this would be an additional
expense without producing a proportionately
better result. Most of the materials used are
inexpensive, being such as have been previously
used in or about the works in some form or
other, and this will, of course, cheapen the cost
of manufacture. The time heretofore lost in
reparing converters having the old style bot-
tom was equivalent to about 1/3 of the working
time, so that, where 100 tons of steel were pro-
duced therein, converters lined by this com-
pound will, in the same time, produce 150 tons.

Claim.—1. A compound consisting of plumb-
ago in the form of old crucibles, German clay,
ground fire-brick, Mount Savage stone-clay, and
burnt or unburnt sand, substantially as de-
scribed.

2. A compound consisting of carbon in the
form of anthracite or bituminous coal, ground
fire-brick, burnt or unburnt sand, and one or
more of the plastic clays, as described, for the
lining of converters.

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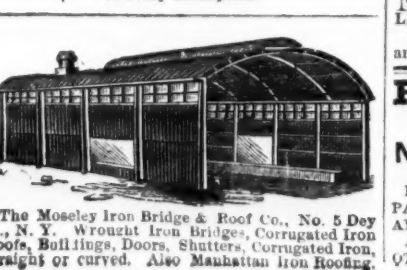
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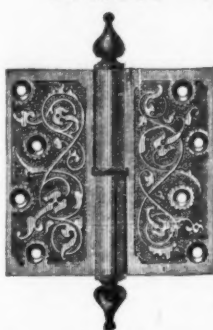
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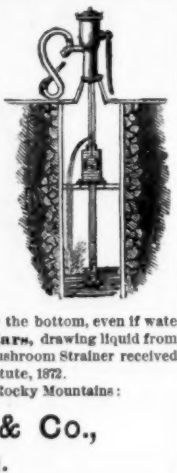
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GEO. M. WOODWARD, Pres't.

On the Molecular Changes produced in Iron by variations of Temperature.

BY PROFESSOR R. H. THURSTON.

(Continued.)

12. The cohesive force which makes its appearance when a gas becomes liquidified is probably considerably increased in all cases when solidification occurs; but the mobility characteristic of the liquid state is so perfect that it is difficult to make the comparison, and we, consequently, have scarcely any reliable data from which to estimate the value of cohesion in fluids. The most valuable are probably those of Prof. Henry*, already referred to, from which he estimated the cohesion of water to be nearly that of ice.

13. In the cases of some, and, probably, of many solids, the relation of these intermolecular forces becomes such that, if the force of polarity is overcome, and the molecules forced from the relative positions which they originally assumed, without, at the same time, changing their relative distances to such an extent as to destroy their tenacity, they may slide into new positions in which they will tend, under the action of this polarity, to remain permanently as before. The action here referred to is illustrated by some of Coulomb's experiments on torsion, by those of the writer on the same point, by M. Treseca's experiments on the flow of solids, and by the common methods of "squirting" lead pipe and of "spinning" brass.

In the experiments of Coulomb, a wire which had been twisted so far as to have taken a permanent set, was found to have its elasticity still unimpaired, and could be twisted as far, without taking a new set, as it could originally before taking the first. In some examples, several successive positions of set, with equal elastic limits, were found. Even a thread of clay, soft and plastic as it is, exhibits this peculiar action. The experiments of the writer on iron and steel $\frac{1}{8}$ of an inch in diameter give precisely similar results.

These experiments are usually quoted in support of the Boscovich theory of alternation of attraction and repulsion, but it may certainly be questioned whether the view just presented is not by far the more probable one—the successive sets being produced by successive renewals of the action of polarity, as the molecules were forced to move among each other without such increase of intermolecular distances as to destroy their cohesion.

14. In cases of true crystallization we have no means of determining whether the formation of the crystal, in its invariable and symmetrical form, is due to Professor Henry's polarizing force, or to still another distinct force, or component of the one intermolecular action.

Since, however, it would be generally supposed that one force may produce both phases of polarization, the universally recognized "principle of least action" in nature suggests the belief that there is but one.

The phenomena of magnetism, and of diamagnetism, are undoubtedly exhibitions of molecular action, under these intermolecular forces, but it remains to be determined whether they are, also, produced by the force under consideration.

The experiments of MM. Chedeville and Treve, at Brest, and of other experimenters, indicate, at least, some relationship between, if not the identity of, these forces.

15. It is sufficiently evident that, granting the relation of these several forces to be such as is indicated by what has preceded, the attractive, repulsive, and polarizing forces of matter may have any relation of intensity, and, consequently, that substances may exist in very various conditions.

We may have a mass of matter, in which repulsion, of any degree of intensity, may be recognized only, as with the gases; attraction and repulsion may equilibrate each other, uniting to produce a mass resisting change of molecular distance, with any degree of force, and yet, in the absence of polarity, offering little or no resistance to change of form, as is the case with the mobile liquids. The addition of the polarizing force confers viscosity upon liquids, and this viscosity has every value until, as it becomes great, in proportion to the intensity of the other forces, we find the mass rigid, and, if cohesion is, at the same time, considerable, the body is hard. A body like the diamond would have great cohesion and, relatively, still greater polarity; iron exhibits great cohesion and considerable polarity, at ordinary temperatures, polarity vanishing faster than cohesion, probably, when the metal is heated.

16. There are some remarkable, and still mysterious, molecular phenomena for which we have neither the space nor the data necessary to their discussion.

The most striking is what may be termed molecular friction. This peculiar phenomenon has been frequently noted, but does not appear to have attracted the attention or to have provoked the careful research that its possible importance should have prompted.

If a bar of steel is magnetized and demagnetized, it is noticed that it most readily accepts afterward the polarity first conferred upon it. What is known as "residual magnetism" is another method, probably, of manifestation of the same action. It is well settled that magnetic phenomena are phenomena of, or invariably accompanied by, molecular movement, and there appears, in these cases, to be exhibited a kind of interatomic friction which, producing a "set," prevents the return of the particles to their original positions, and allows the force of polarity to be most readily overcome in a definite direction.

The "fatigue" of metals, which has been so fully and elegantly investigated by Wohler,† may be an exhibition of the effect of similar causes. It may, however, be simply due to un-

* Proceedings Am. Phil. Soc. 1844.
† Über die Festigkeitversuche mit Eisen und Stahl: A. Wohler, Berlin, 1870.

equal tension, and the consequent gradual rupture, successively, of overstrained portions of metal, the work being thus thrown upon smaller and smaller sections of sound metal, until the whole becomes finally disrupted.

The determination of the effects of chemical changes upon molecular tensions presents a wide and, as yet, almost absolutely unknown field of research.

For one of the most complete and consistent theories of molecular physics which has been proposed, we are indebted to Professor W. A. Norton*.

17. It will require much additional experimental investigation, and far more carefully planned and systematic research than has been yet given to the subject, to furnish the basis for a perfectly satisfactory theory of the nature, and modes of action of corpuscular forces.

If we may draw any conclusions from what is known already, we should probably infer that, when in the gaseous condition, the molecules of matter tend continually to separate, under the action of a repellant molecular force, which has greater magnitude as the gas is compressed.

As this compression goes on, either by the application of mechanical force, or by the abstraction of heat, a point is finally reached at which an equilibrium occurs between the forces tending to produce reduction of volume and those tending to expand the mass.

Any effort which may be made to destroy this equilibrium, and to increase the intermolecular distances, and, by the same action, to enlarge the volume, may be found, as in the case of water, to be resisted with some force, while an effort to produce a change of distance, by forcing the particles from their positions of equilibrium in the other direction, reducing the volume, may meet very great resistance. And while resistance to change of distance is observed, it may happen that the resistance to change of position, among the molecules in a group, may be, and often is, quite unobservable.

18. Abstracting heat still further, solidification finally occurs.

As, throughout the process of contraction, up to this point, the attractive force has gradually increased, in its power of resisting disturbance of equilibrium and change of molecular distances, it would be anticipated that the solid would exhibit greater cohesion than the liquid. There is but little evidence bearing upon this point, and it will require extended and skillful, as well as patient, investigation, in the field of Prof. Henry's labors, to furnish what is needed. What we have learned indicates that this increase does occur, and that its amount is very great.

19. The simple increase of cohesive force, where the distances between the molecules are still so immense in comparison with the magnitudes of those molecules, would not be expected to give increased elasticity of volume. On the contrary, during the change from the gaseous state the loss of elasticity of volume has been a marked characteristic.

(It is considered by some philosophers to be well ascertained that the radius of molecular action is less than one five-millionth of an inch in some cases, and that it probably does not equal one two-thousandth of an inch in any instance.) At least one writer considers that the molecule has an orbital radius not exceeding 1-2,500,000,000th of an inch. The existence of animal organisms as small as 1-250,000,000th of an inch in length indicates that even these figures are not probably too small.)

20. An unavoidable inference from the language of authorities most frequently quoted is, that elasticity of form—the quality of which the so-called elasticity and the resilience of solids is a consequence—results from the existence of a property in solid matter by which change of distance between molecules may occur to a marked extent without rupture.

This, if true, would indicate elasticity of form to vary with elasticity of volume.

This, we should infer, may be a mistake, the elasticity of volume being probably less in the solid than in the liquid, while elasticity of form is absent in the latter.

If it be the fact that the elasticity of form, and the resilience of solids are not due to elasticity of volume, primarily, we are justified in attributing them to the property of pliability, produced by the comparatively wide range of intermolecular movement permitted by the force of polarity. In examples of great elasticity, it may have an intensity, small in comparison with that of the other forces acting in the mass, and, at the same time, it, or the cohesive force, or both, may vary at a less than ordinary rate with a given change of distance.

21. We have followed what can be considered as scarcely more than a train of hypotheses, but it is evident that the faint light which has been thrown upon the subject exhibits, at least, a probability that they approximate with some degree of closeness to the truth.

We may deduce from what has been stated, finally, that it is extremely probable that the contraction in volume, of a solid, by approximation of molecules, will increase the absolute strength, while decreasing the viscosity of the body, and, as a consequence, diminishing the resilience, by contracting the elastic limits. The mass might have a higher modulus of elasticity, and higher tenacity, but would more readily yield under a shock or a blow.

22. We should expect these changes in metals to be most marked within ordinary limits of temperature, in the cases of those metals which have lowest temperatures of solidification, since, in such examples, the complete change from absolute mobility to perfect rigidity is comprised within the least range of temperature.

23. All other things being equal, since lowering the temperature reduces the mobility of particles, and increases the viscosity of the

metal, we should anticipate that the greater toughness of the material at the higher temperature, while in the solid state, would not only exhibit itself in greater resilience, but would also modify the character of the fracture, when ruptured by external force, making it less "short" and glass-like—wherever the substance possessed anything of the characteristics illustrated by Coulomb's experiments, noted above—at a high, than at a low heat. The fracture would be expected to appear "fibrous" and "thready" when, as in ordinary wrought iron, foreign substances present or varying quality of metal should produce in adjacent parts unequal "drawing down" at the higher temperature.

24. Where, as in iron, the change from the liquid condition through the pasty, semi-fluid welding state, to the condition of comparative brittleness at ordinary temperatures, has been a somewhat regular one, it would be anticipated that the change might continue with still further decline in temperature. It would not appear unlikely that such change might progress indefinitely, or until resilience was absolutely destroyed by the approximation of molecules, and the coincident fixity due to a maximum intensity of polarity.

Where the body has sensible viscosity and considerable resilience, it would be expected that, if broken suddenly, as by a quick jerk, its fracture would be complete before the particles, retarded by inertia and by molecular friction, could have time to shift their positions, while, when slowly broken, a considerable amount of motion might occur before rupture could be completed.

In the former case, the appearance of the break and the diminution of section would be characteristic of tough, and in the latter, they would apparently indicate brittle, material.

25. Such being, not improbably, a statement of the general effects of changes of temperature upon matter, it remains for the engineer to determine, by experiment, how fully the most generally useful metal, iron, presents an example of these effects, and how far they are modified by differences of chemical constitution and of physical condition.

The most interesting and instructive experiments which have yet been made are those of Fairbairn, Kirkaldy, Professor Johnson, of a committee of the Franklin Institute; of a committee appointed by the king of Sweden, of Brockbank, Joule, Sandberg, and Spence.

26. Tredgold, the celebrated engineer, whose intelligence and experience have given his published opinions very great weight, believed that any increase of temperature would diminish the tenacity of metals.

Dr. John Percy, on the contrary, with probably the majority of engineers, believe the opposite to be the effect, basing the belief upon the well known fact that accidents more frequently occur from fracture in cold than in warm weather. So common is this belief, that the statement recently made, that the real effect of decrease of temperature, other things being equal, may be to increase tenacity, has been received with very general distrust.

27. The magnitude of a change of tenacity arising from simple approximation of molecules, and consequent increase of cohesion, could not be expected to be very great, since this change of distance between adjacent particles is but about seven one millionths of its ordinary value for a range of one degree. Were the tenacity to vary as the square of the distance, the consequent variation would be but one and a half per cent., and would be but two per cent. were it to vary, within this range, as the cube of the intermolecular distances for a range of one thousand degrees.

[To be continued.]

A practical method of determining the heating power of fuel has recently been given by E. Seidler, in the *Zeitschrift für Zuckerindustrie*. The object is attained by first drying some 100 lbs. of the fuel at 1000 and noting the loss in weight; then, by burning a measured amount, 2000 lbs., for instance, weighing the ashes and cinders, and, after allowing $\frac{1}{4}$ per cent. for ashes carried off by the draught, calculating the amount of combustible in the fuel; e. g., supposing the fuel was found to stand as follows: Water, 40- $\frac{1}{2}$ per cent.; ashes and cinders, 17 per cent.; ashes carried off by draught, 0- $\frac{1}{4}$ per cent.; total, 58 per cent., leaving 42 per cent. of combustible in the fuel—2 per cent. may be subtracted from the percentage of ashes and cinders for the coal which falls between the bars of the grate. For peat, multiply the percentage of combustible thus found by the factor 7, and deduct from that the percentage of water in the fuel, to arrive at the amount of water in pounds which will be evaporated by one pound of the fuel; e. g., in the above case, $0.42 \times 7 = 2.94$. $2.94 - 0.4075 = 2.5325$. A ton of such fuel then will evaporate $2000 \times 2.5325 = 5065$ lbs. water at 10 deg. C., developing $5065 \times 640 = 3,241,600$ heat units. If the water used is run into the boiler at a higher temperature, 30 deg. C., for example, the amount that can be evaporated by one ton is $3,241,600 = 5228$ lbs.

630

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* American Journal Science and Art, 1872.

† Wurtman.

‡ Robison.

§ Gaudin.

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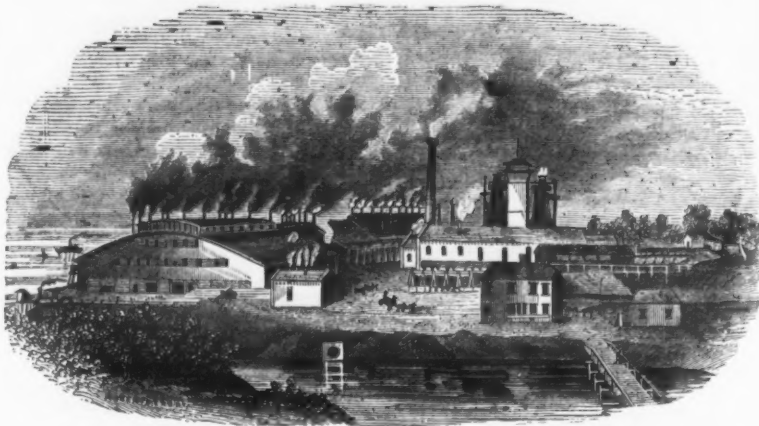
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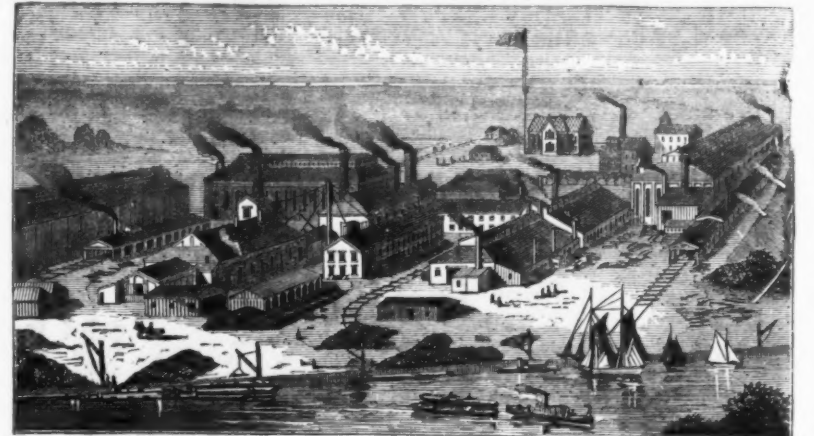
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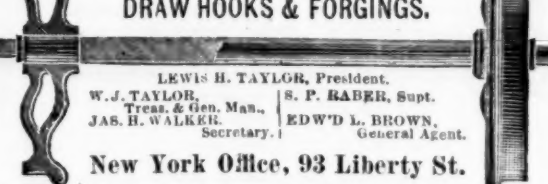
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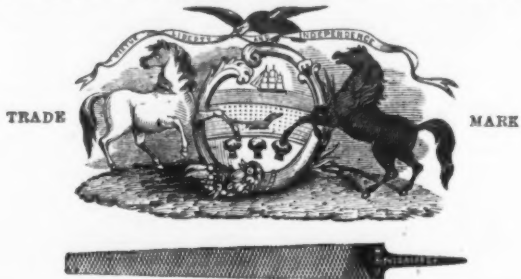
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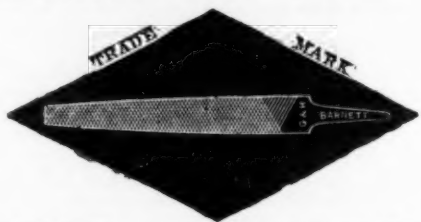
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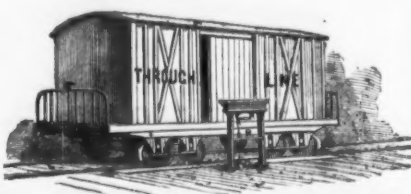
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The second immense anchor-plate for the

East River bridge was recently cast at the

South Brooklyn Steam Engine Works, in Brook-

lyn. The forming of the mold in which to

cast the anchor-plate occupied four weeks. At

first a circular excavation was made 25 feet in

diameter and 3 feet deep, at the bottom of which

was placed an iron plate. A course of brick

work 8 inches thick was laid upon this, the up-

per surface of which was leveled off and laked

with charcoal. This surface served as the basis

of the mold, which was of loam, secured by

brick work and iron girders built in sections.

The anchor-plate is 17 feet 6 inches by 16 feet in

dimensions, and of an oval shape, with a thick-

ness at the ribs of 3 feet. When cleaned it

weighed 47,000 pounds, and cost \$3,200. The

amount of iron melted was 60,000 pounds,

which was transferred to a large tank, and from

thence allowed to run into the mold. No acci-

dent occurred during the casting, which was

allowed one week to cool.

J. Cornell & Co., of Sandy Hill, are making

machinery for the Cape Fear Fibre Company, of

Wilmington, N. C.

BUSINESS ITEMS.

NEW YORK.

The second immense anchor-plate for the East River bridge was recently cast at the South Brooklyn Steam Engine Works, in Brooklyn. The forming of the mold in which to cast the anchor-plate occupied four weeks. At first a circular excavation was made 25 feet in diameter and 3 feet deep, at the bottom of which was placed an iron plate. A course of brick work 8 inches thick was laid upon this, the upper surface of which was leveled off and laked with charcoal. This surface served as the basis of the mold, which was of loam, secured by brick work and iron girders built in sections. The anchor-plate is 17 feet 6 inches by 16 feet in dimensions, and of an oval shape, with a thickness at the ribs of 3 feet. When cleaned it weighed 47,000 pounds, and cost \$3,200. The amount of iron melted was 60,000 pounds, which was transferred to a large tank, and from thence allowed to run into the mold. No accident occurred during the casting, which was allowed one week to cool.

J. Cornell & Co., of Sandy Hill, are making machinery for the Cape Fear Fibre Company, of Wilmington, N. C.

PENNSYLVANIA.

The double furnaces of one of the mills of the Pennsylvania Iron Works, at Danville, are being changed into single furnaces. These works are very extensive, and when in full operation employ 1200 hands. Over 3000 tons of rails per month are turned out, besides other products. The works are owned by Messrs. Waterman & Beaver.

Owing to the exorbitant freight charges of the Bald Eagle Valley Railroad Company, the Valentine Iron Works are to be removed from Bellefonte to Williamsport. The company has raised a capital of \$200,000, and are to commence work of removal immediately. Another enterprise is projected at Bellefonte, which is the erection of car works. A company has been formed, officers elected, and a capital of \$100,000 subscribed toward establishing the project.

The works of the Pittsburgh Smelting and Refining Company are located at Allegheny, on South Canal street. It is found necessary to enlarge them, and a location is required affording more room and better facilities. The company is managed by our best and most practical manufacturers, and has been smelting silver ores from Utah for some months. The ore yields about 50 per cent. of lead, beside the silver, which is a great convenience to our glass manufacturers, who consume large quantities daily. The expense of bringing the ore from Utah is \$300 a car-load, and \$30 per ton.

The Allentown Rolling Mill, says the *Register*, is running full time, and since the capacity of the mills have been so greatly increased the company are enabled to fill their orders more rapidly. They have now on hand \$600,000 of manufactured iron, most of which is sold.

The rolling mill and new furnaces of the Lochiel Iron Works, at Harrisburg, are now in full blast, giving employment to five thousand men. From sixty to seventy tons of rails are made per day.

Messrs. Cole & Hallman, proprietors of the Union Steam Boiler Works, at Allentown, are doing a thriving business in their line of manufactures. This concern has been in existence less than ten years, and sprang from very small beginnings. They now employ 125 hands, and disburse monthly over \$5000 as wages.

The Erie Car Wheel Works are now turning out four hundred car wheels per day. When first started the capacity of the establishment was only eight per day.

The furnace of the Leeson Iron Company, in Berks county, turns out two hundred tons of metal per week.

The old Otis Furnace, at Sharon, has blown in after five months' idleness, many improvements having been added.

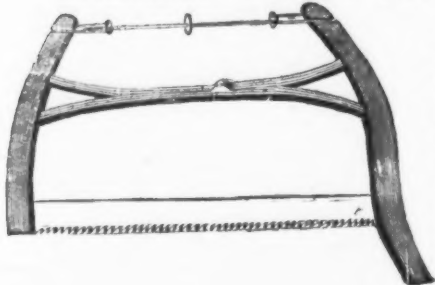
The Allentown Iron Company owns twenty-seven mines in Pennsylvania, and employs, in all its various establishments, nine hundred hands.

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SAW, TOOL, STEEL AND FILE WORKS,

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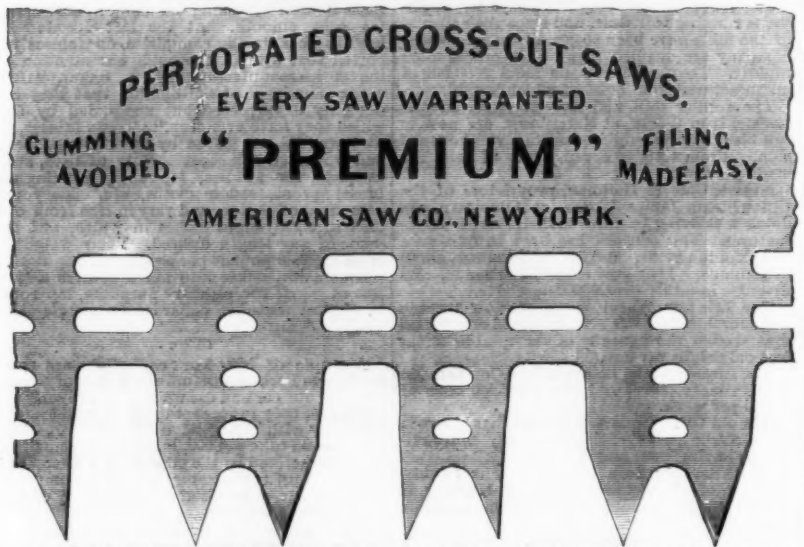


Patented June 28th, 1870.
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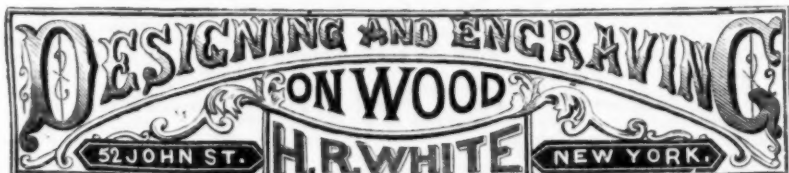
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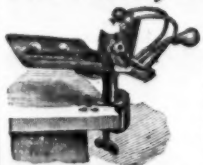
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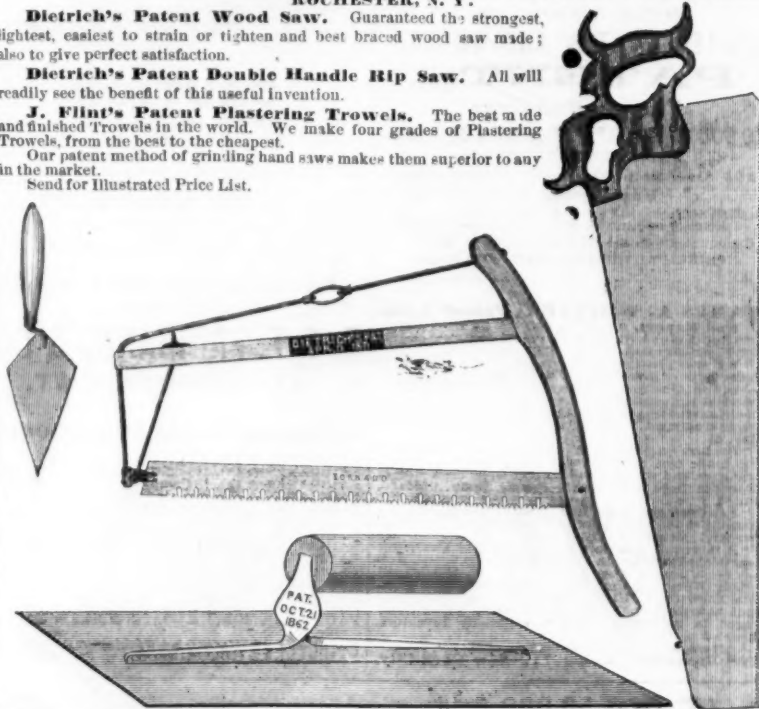
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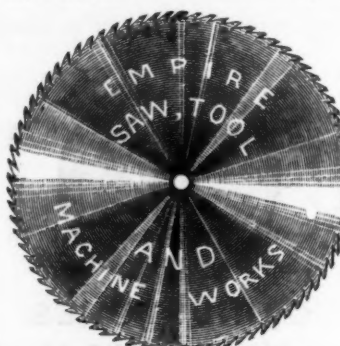
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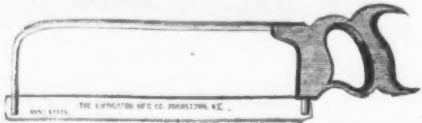
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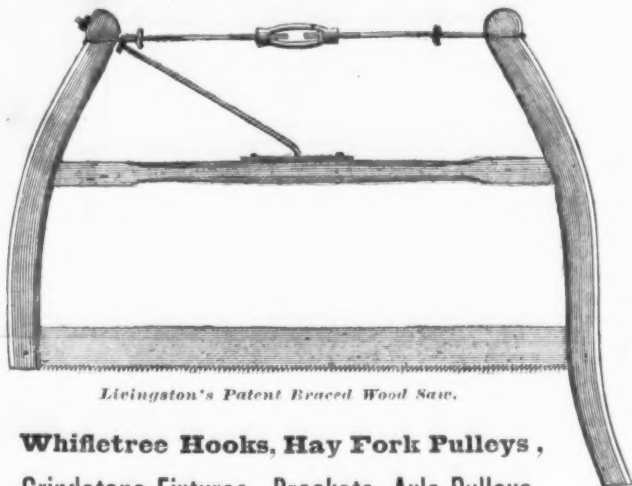
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Livingston's Patent Butcher Saw.



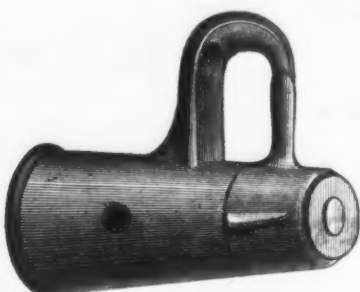
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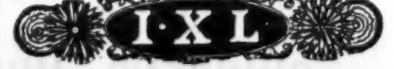
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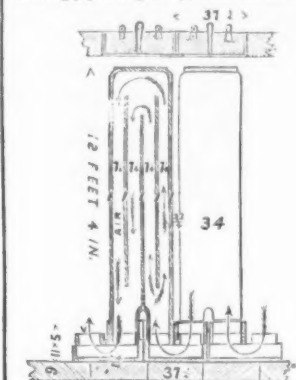
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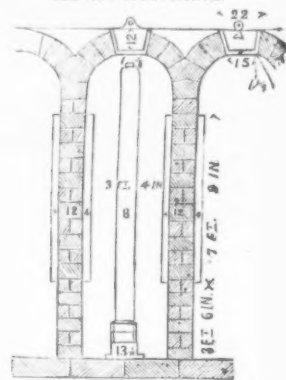
JOSEPH CRAMPTON, Agent,

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Showing pipes lengthways in one section.



End view of one section.



REFERENCE.

PHILADELPHIA, Nov. 16, 1873.

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Every Tool Warranted.



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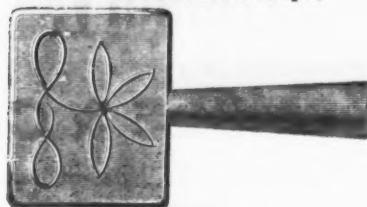
Largest Stock and Best Assortment in the United States of

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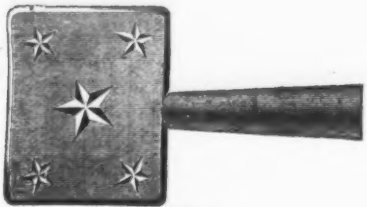
Also, BEST QUALITY SOCKET FRAMING CHISELS.

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Patent Embossed Steps.



Leaf Pattern.



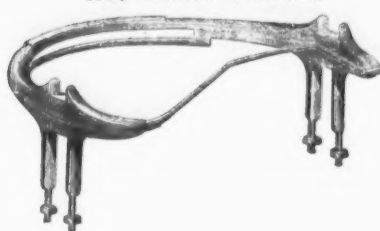
Star Pattern.

King Bolt Yokes.

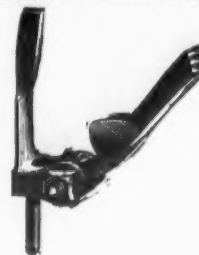


Established 1850.

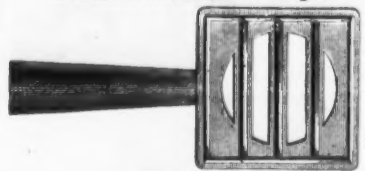
No. 6 Fifth Wheels.



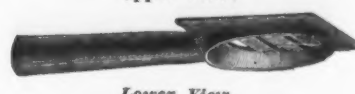
1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.

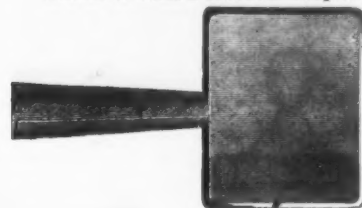


Upper View.

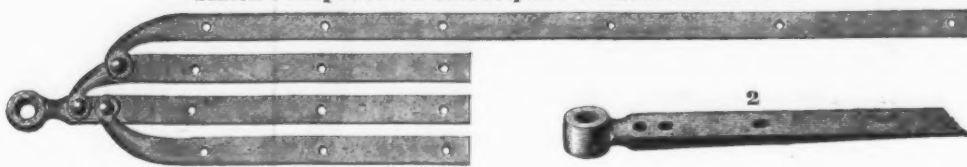


Lower View.

Solid Plain Pattern Steps.



Smith's Improved Philadelphia Pattern Slat Irons.



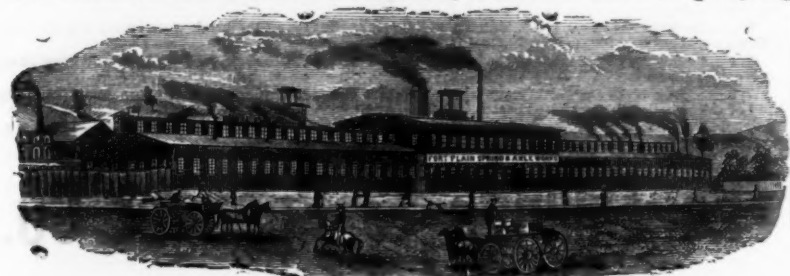
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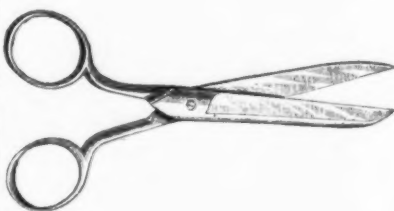
H. Wentworth, F. A. Plated-
David Wentworth.

OFFICE AND WORKS,



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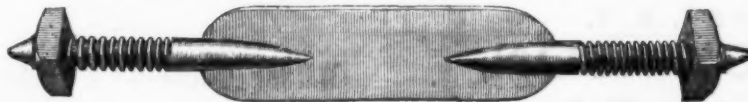
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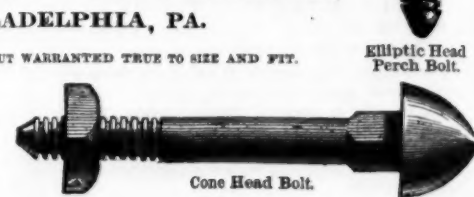
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Agricultural Steels, etc., Manufacturers of.	
Nella, A. J., 30, Pittsburgh, Pa.	28
Axe, Manufacturers of.	
Fisher & Norris, Trenton, N. J.	20
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Richards, Lowell, 6, Philadelphia.	31
Belows, Manufacturers of.	
Churchyard, Joseph, Buffalo, N. Y.	7
Newcomb Bros. Sons, 398 Water, N. Y.	24
Belting, Leathers, Manufacturers of.	
Alexander Bros., 112 N. 3d, Phila.	12
Belt Patches, Manufacturers of.	
Kellogg E. C. & Co., Hartford, Conn.	30
Bird Cages, Manufacturers of.	
Lindeman O. & Co., 241 Park, N. Y.	2
Flaxmeyer John, 291 Pearl, N. Y.	2
Bit Braces, Manufacturers of.	
Miller's Falls Mfg. Co., 78 Beekman, N. Y.	21
Boilers—Steam.	
Corner Thorpe and Chestnut, Phila.	31
Boiler Compound, Makers of.	
Mayer L. 99 Mercer, N. Y.	31
Boiler Heading Machines, Manufacturers of.	
Chapin Machine Co., New Hartford, Conn.	7
Lewis, Oliver & Phillips, Pittsburgh, Pa.	7
Plumb, Burdett & Barnard, Buffalo, N. Y.	32
Brass, Manufacturers of.	
Ansonia Brass and Copper Co., 19 Cliff, N. Y.	2
Benedict & Barnham Mfg. Co., Waterbury, Conn.	2
Brooklyn Brass and Copper Co., 100 John, N. Y.	2
Coe Brass Mfg. Co., Wolcottville, Conn.	2
Flume & Atwood Mfg. Co., 80 Chambers, N. Y.	2
Sevill Mfg. Co., 1 Beekman, N. Y.	2
Wallace & Sons, 39 Chambers, N. Y.	2
Waterbury Brass, 32 Beekman, N. Y.	2
Brick Presses, Manufacturers of.	
Carroll Geo., 1819 Germantown Ave., Phila.	8
Carroll F. L. & D. L., 1841 Germantown Ave., Phila.	8
Bridge Builders.	
Konoley Iron Bridge and Roof Co., 5 Dey, N. Y.	4
Bronze Valves, Manufacturers of.	
Whitney Mfg. Co., 162 and 164 W. 27th, N. Y.	8
Button Hole Cutters, Manufacturers of.	
Goodnow & Wightman, Boston.	24
Butts and Hinges, Manufacturers of.	
Etna Nut Co., Southington, Conn.	22
Crooke & Co., 163 Mulberry, N. Y.	27
Ohio Nut Co., 97 Chambers, N. Y.	24
Roy & Co., 200 Chambers, N. Y.	24
Miller's Falls Mfg. Co., 78 Beekman, N. Y.	21
Union Mfg. Co., 56 Chambers, N. Y.	5
Cabinet Hardware, Manufacturers of.	
Landers, Frank, 100 Chambers, N. Y.	11
Carriage Bolts, Manufacturers of.	
Skelly T., 24th below Calowhill, Phila.	12
Townsend, Wilson & Hubbard, Phila.	12
Carriage Hardware, Manufacturers of.	
Hayden, Letchworth & Smith, Auburn, N. Y.	12
Smith H. D. & Co., Plantville, Ct.	12
Car Wheels, etc., Manufacturers of.	
Jackson & Bordin Mfg. Co., Berks, Pa.	6
Taylor Iron Works, High Bridge, N. Y.	6
Cash Drawer—Alarm, Manufacturers of.	
Tucker & Dorsey, Indianapolis, Ind.	15
Casters—Furniture, Manufacturers of.	
Toler John, Sons & Co., Newark, N. J.	32
Chains, Makers of.	
Rendrick & Runkle, Trenton, N. J.	14
Wyatt Thos., 71 Eddy, Providence, R. I.	14
Cherry Stoppers, Makers of.	
D. H. Goodell, Astoria, N. H.	10
Chisels, Manufacturers of.	
Buck Bros., Millbury, Mass.	11
Clothes Wringers, Manufacturers of.	
Providence Tool Co., 11 Warren, N. Y.	14
Young John & Sons, Amsterdam, N. Y.	13
Cnals, Dealers in.	
Boyer L. S. & Co., 70 Broadway, N. Y.	3
Coal, Miners of.	
Pardee A. & Co., 111 Broadway, N. Y.	14
Coal and Iron, Dealers in.	
Fersons L. W., 38 Webster, Providence, R. I.	3
Coal Hods, Manufacturers of.	
Smith Burns & Co., 45 Cliff, N. Y.	20
Coffee and Spice Mills.	
Lane Brothers, Millbrook, N. Y.	30
Coffin Trimmings.	
Wayne Hardware Co., Cincinnati, O.	10
Wilmarth W. D., Attleboro, Mass.	7
Commission Merchants, English.	
Goddard Samuel A. & Co., Birmingham, Eng.	26
Commission Merchants, Manufacturers of.	
Bemis & Call Hardw., 200 Springfield, Mass.	13
Cooper's Tools, etc., Dealers in.	
Little Chas. E., 59 Fulton, N. Y.	14
Cordage, Rope, etc.	
Allen D. S. Sons, 106 Front, N. Y.	20
Corrugated Steel Pipe Elbows, Manufacturers of.	
Corrugated Metal Co., East Berlin, Conn.	4
Sellew Elbow Co., N. Y. and Chicago.	24
Crucibles, Manufacturers of.	
Newkumet Philip, 2nd and Vine, Phila.	3
Joseph Dixon Crucible Co., Jersey City, N. J.	82
Ross, Stow & Hookkamp, 1438 N. 6th, Phila.	32
Taylor, Stow & Hookkamp, Phila.	32
Curry Combs, Manufacturers of.	
Kellogg W. F. & Co., Troy, N. Y.	15
Cutlery, Importers of.	
Baker Hermann & Co., 101 Duane, N. Y.	22
Bohnstedt & Co. (Solingen), 271 Canal, N. Y.	11
Dickinson Henry, 66 and 68 Reade, N. Y.	11
Fisher Jos. S., 411 Commerce, Phila.	11
King H. & J. W., 81 Chambers, N. Y.	11
Poebe Chas. Jr., 82 Chambers, N. Y.	11
Ward Asahel, 101 Duane, N. Y.	11
Wilson Hawkins, 101 Duane, N. Y.	11
Smith & Hall, 50 and 60 Reade, N. Y.	11
Taylor Thomas, 43 Chambers, N. Y.	11
Cutlery, Manufacturers of.	
American Knife Co., Easton, Conn.	11
Burginshaw Aaron, Peppercorn, Mass.	11
Landers, Frank, 100 Chambers, N. Y.	11
Miller Bros. Cutlery Co., W. 4th, N. Y.	11
New York Knife Co., Walden, N. Y.	11
U. S. Steel Shear Co., W. Meriden, Conn.	11
Differential Pulley Blocks, Manufacturers of.	
Van Wart & McCoy, 43 Chambers, N. Y.	31
Dredging, and Makers of Dredging Machines.	
Am. Dredging Co., 214 S. Delaware Ave., Phila.	30
Drill Chucks, Manufacturers of.	
Cushman A. F., Hartford, Conn.	30
Hubbard & Curtis Mfg. Co., 82 Chambers, N. Y.	31
Drills (Hand), Blacksmith, Manufacturers of.	
Morrell & Tibbott, Williamsburgh, N. Y.	23
Drilling Machines, Manufacturers of.	
Miller Falls Mfg. Co., 78 Beekman, N. Y.	21
Thorne & DeHaven, Philadelphia.	30
Edge Tools, Manufacturers of.	
Bradley G. W., 31 Chambers, N. Y.	8
Elevators, Makers of.	
Ott Bros. & Co., 38 Broadway, N. Y.	9
Emery Wheels, Makers of.	
The Tante Co., Stroudsburg, Pa.	9
The Union Stone Co., 16 Exchange, Boston.	9
Merrill E. C., Charleston, Vt.	9
Enamelled and Plain Hollow Ware, Mfgs. of.	
Foxell & Jones, Troy, N. Y.	2
Engineers, Machinists, etc.	
Henshall James, 106 Beach, Phila.	31
James Moore, cor. 19th and Eastwood, Phila.	30
Tave & Hartman, 123 N. Front, Phila.	30
Engines, Steam, Makers of.	
Finchland Landing Mfg. Co., Fishkill-on-the-Hudson, N. Y.	13
New York Steam Engine Co., 98 Chambers, N. Y.	25
Paulding, Kenable & Co., 30 Broadway, N. Y.	25
Witchell, Smith & Co., Newburgh, N. Y.	24
Wright J. W., 112 Spruce, Phila.	24
Yale Iron Works, New Haven, Conn.	21
Engravers, Wood.	
Paterson Jas. S., 21 Spruce, N. Y.	30
Roberts Wm., 36 Beekman, N. Y.	15
Tuttle, D. H., 3 Beekman, N. Y.	15
White H. R., 62 John, N. Y.	15
Eyeglasses.	
Union Eyeglet Co., Providence, R. I.	2
Faucets, Self-Measuring, Manufacturers of.	
Enterprise Mfg. Co., Pa., Phila. and N. Y.	26
Files, Importers of.	
Carr J. & Riley, 82 John, N. Y.	26
Dickinson Henry, 66 and 68 Reade, N. Y.	9
Fisher Joseph S., 411 Commerce, Phila.	8
Fraser Peter A. & Co., 85 Fulton, N. Y.	8
Homer Foot & Co., Springfield, Mass.	4
Moss F. W., 80 John, N. Y.	8
Sanderson Bros., 16 Cliff, N. Y.	8
Spears & Jackson, 36 Chambers, N. Y.	8
Files, Manufacturers of.	
Barnett G. H. & Co., 41 and 43 Richmond, Phila.	8
McCaffrey & Bro., 122 and 124 N. 4th, Phila.	8
Nicholson File Co., Providence, R. I.	8
Roberts John & William, 35 Chambers, N. Y.	8
Wheeler, Clemson & Co., Middletown, N. J.	8
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Watson John E., Perth Amboy, N. J.	3
Fluting Machines, Makers of.	
Lowerre & Tucker, Newark, N. J.	30
Murill & Keller, Baltimore, Md.	31
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Lefferts Marshall Jr., 41 Beekman, N. Y.	4
Galvanized Iron.	
Field Alfred & Co., 47 John, N. Y.	2
Galvanized Wire.	
Field Alfred & Co., 47 John, N. Y.	2
Gate Hinges, Self-Closing, Makers of.	
Clark & Co., Buffalo, N. Y.	22
Glass, Importers of.	
Downing A. C. & Co., 57 Beekman, N. Y.	12
Hills, Turner & Harmon, 193 State, Boston.	12
Glass Pots, Family, Makers of.	
J. & E. Stevens Co., Cromwell, Conn.	26
Grindstones.	
McDermott J. & Co., Cleveland, O.	9
Wood Walter H. & Co., 283 and 285 Front, N. Y.	9
Gunpowder, Makers of.	
Kneeland F. L. (Dupont) 70 Wall, N. Y.	28
Lafin & Rand Powder Co., 21 Park Row, N. Y.	28
Hammers, etc., Manufacturers of.	
Emmet Hanger Co., Brooklyn, E. D., N. Y.	24
Hammond C. & Son, 13 N. 3th, Phila.	24
Minot & Co., Oliver, Boston.	15
Hardware, Brass and Galvanized.	
Tibbott W. & J., 280 Canal, N. Y.	2
Hardware, Commis-sion Merchants.	
Fernald & Sise, 100 Chambers, N. Y.	8
Green R. M., 100 Chambers, N. Y.	12
Graham & Haines, 88 Chambers, N. Y.	12
Walbridge Geo. B., 55 Chambers, N. Y.	22
Hardware Dealers.	
Brown, Harris & Hopkins, 180 Greenwich, N. Y.	14
Finney Thos. J. & Co., 13 Chambers, N. Y.	26
Hubbard & Curtis Mfg. Co., 82 Chambers, N. Y.	26
Loudback, Gilbert & Co., 38 Chambers, N. Y.	13
Shupard Sidney & Co., Buffalo, N. Y.	21
Turner, Seymour & Judas, 64 Duane, N. Y.	8
Van Wart & McCoy, 43 Chambers, N. Y.	20
Turner, Seymour & Judas, 64 Duane, N. Y.	8
Wichus F. 44 Chambers, N. Y.	11
Hardware Importers.	
Beam & Murray, 54 Cliff, N. Y.	22
Baker Hermann & Co., 101 Duane, N. Y.	22
Field Alfred & Co., 47 John, N. Y.	22
Hilger & Sons, 87 Chambers, N. Y.	22
King H. & J. W., 80 Chambers, N. Y.	22
Smith & Hall, 50 and 60 Reade, N. Y.	22
Loudback, Gilbert & Co., 38 Chambers, N. Y.	22
Van Wart & McCoy, 43 Chambers, N. Y.	20
Turner, Seymour & Judas, 64 Duane, N. Y.	8
Wichus F. 44 Chambers, N. Y.	11
Hardware Manufacturers.	
Biddle Mfg. Co., 78 Chambers, N. Y.	22
Chertoff, F. & Co., 113 Chambers, N. Y.	11
Corbin P. & F., 87 Chambers, N. Y.	24
Durrie Horace, 97 Chambers, N. Y.	24
Enterprise Mfg. Co., Phila.	24
Hubbard & Curtis Mfg. Co., 82 Chambers, N. Y.	13
Kellogg Wm. P. & Co., Troy, N. Y.	20
Lane, Gale & Co., 34 Duane, N. Y.	20
Loudback, Gilbert & Co., 38 Chambers, N. Y.	22
Many F. L. & Marshall, 48 Warren, N. Y.	26
Middleton Tool Co., 11 Warren, N. Y.	22
Miller's Falls Mfg. Co., 78 Beekman, N. Y.	21
Patt & Co., Buffalo, N. Y.	22
Providence Tool Co., 11 Warren, N. Y.	22
Russell & Erwin Mfg. Co., 45 Chambers, N. Y.	24
Schwitzer Mfg. Co., 57 Reade, N. Y.	4
Shattuck W. F. & Co., 113 Chambers, N. Y.	22
Shattuck Works, 58 Beekman, N. Y.	22
Taylor Mfg. Co., New Britain, Conn.	30
Turner, Seymour & Judas, 64 Duane, N. Y.	8
Union Mfg. Co., 56 Chambers, N. Y.	5
Williams, White & Churchill, 78 Warren, N. Y.	21
Wilson Mfg. Co., 87 Chambers, N. Y.	21
Hardware Spectacles.	
Biddle Mfg. Co., 78 Chambers, N. Y.	26
Haase John A., rear 116 Vanhorn, Phila.	9
Holton F. G. & Co., Cincinnati, O.	21
Loudback, Gilbert & Co., 38 Chambers, N. Y.	22
Seiple, Birge & Co., St. Louis.	21
Helve Hammers, Makers of.	
Bradley & Runkle, Trenton, N. J.	25
Hoisting Engines, Makers of.	
Ott Bros. & Co., 348 Broadway, N. Y.	8
Horse Nails, Makers of.	
Ausable Horse Nail Co., 36 Chambers, N. Y.	28
Brundage W. C., Middletown, N. Y.	5
Globe Nail Co., Boston, Mass.	28
Pratt & Co., Buffalo, N. Y.	22
Putnam S. S. & Co., Neponset, Mass.	8
Horse Shoes, Makers of.	
Buklen Iron Works, Troy, N. Y.	4
Hubs and Spokes, Mfrs. of.	
Gleason J., 2nd and Diamond, Phila.	12
Hydraulic Jacks.	
Hudson Richard, 24 Columbia, N. Y.	31
Ice Cream Freezers, Makers of.	
Blanchley C. G., 50 Commerce, Phila.	21
Packer C. W., Phila.	21
Shepard Sidney & Co., Buffalo, N. Y.	21
Torry E. S. & J., 166 Fulton, N. Y.	20
Insurance, Boiler.	
Hartford Steam Boiler and Inspection Co., 52 Wall, N. Y.	13
Insurance Fire and Marine.	
National Fire Ins. Co., 52 Wall, N. Y.	30
Iron Brokers.	
Boynton Geo. A., 70 Wall, N. Y.	6
Hazard & Jones, 212 Pearl, N. Y.	4
Little Wm. H., 2 Wall, N. Y.	4
Iron, Corrugated, Manufacturers of.	
Corrugated Metal Co., East Berlin, Conn.	10
Iron, Charcoal, Warm or Cold Blast.	
Quincy John W., 98 Wall, N. Y.	4
Iron Commissioners.	
Blackston & Co., 335 Walnut, Phila.	6
Hand Jas. C. & Co., 614 and 616 Market, Phila.	6
Mallin Bros., 228 Dock, Phila.	6
Williamson James & Co., 60 Wall, N. Y.	4
Iron Dealers.	
Abel Brothers, 180 South, N. Y.	4
Bonnell, Botsford & Co., Youngstown, O.	4
Borden & Lovell, 70 and 71 West, N. Y.	4
Buchanan Geo., 19 Birchen Lane, London, E. C.	4
Cleveland Bros. & Co., Columbus, O.	4
Coddington T. B. & Co., 35 Cliff, N. Y.	4
Conklin & Huerst, 29 Market Slip, N. Y.	4
David & Wheeler, 785 Pine, N. Y.	4
Fuller, Lord & Co., 128 Greenwich, N. Y.	4
Fuller, Dana & Fitz, 110 North, Boston.	4
Gardner Wm., 575 Grand, N. Y.	4
Hall, Chicago & Co., Chicago.	4
Harrison & Gilson, 558 to 560 Water, N. Y.	4
Jackson & Chase, 336 and 338 Franklin, N. Y.	4
Judson F. F., 47 and 49 Water, N. Y.	4
Mathews Chas. W., 138 Walnut, Phila.	4
Packard, Gott & Co., Youngstown, O.	4
Pierstone & Co., 24 Broadway, N. Y.	4
Pope Thos. J. & Bro., 292 Pearl, N. Y.	4
Quincy John W., 98 Wall, N. Y.	4
Richards D. W. & Co., 323 Pearl, N. Y.	4
Warner A. B. & Sons, 26 and 28 West, N. Y.	4
Williamson James & Co., 60 Wall, N. Y.	4
Whitney Alfred R., 58 Hudson, N. Y.	4
Iron, Manufacturers of.	
Atwater, Wheeler & Co., New Haven, Conn.	6
Britannia Iron Works, Middletown, Conn.	6
Burden Iron Works, Troy, N. Y.	6
Cartwright, McCurdy & Co., Cleveland, O.	6
Cleveland Rolling Mill Co., Cleveland, O.	6
Coffin Wm. E. & Co., 3 Oliver, Boston.	6
Ellis W. R. & Co., 17 Battery March, Boston.	6
Everson, Grant & McGraw, Phila.	6
Fulton S. & Co., 412 Walnut, Phila.	6
Jones & Laughlin, Pittsburgh, Pa.	6
Leonard John, 420 and 421 West, N. Y.	6
Lynchburg Iron Works, Lynchburg, Va.	6
Milwaukee Iron Co., Milwaukee, Wis.	6
Niles Iron Co., Niles, Mich.	6
New Haven Rolling Mill Co., New Haven, Ct.	6
Old Dominion Iron & Nail Works Co., Richmond, Va.	6
Oxford Iron Co., 81 Washington, N. Y.	6
Phelps Iron Co., 410 Walnut, Phila.	6
Rowland Wm. & Harvey, Phila.	6
Iron, Hoop, Manufacturers of.	
Wm. Clark & Co., Pittsburgh, Pa.	4
Iron, Swedish, Importers of.	
Jesson W. & Sons, 91 and 93 John, N. Y.	28
Mitander Nils, 60 William, N. Y.	4
Page Ewd. & Co., Boston, N. Y. and Phila.	4
Lace, Leather, Manufacturers of.	
Stoye Wm., 403 Library, Phila.	12
Lanterns, Manufacturers of.	
Howard & Morse, 45 Fulton, N. Y.	2
Lawn Mowers, Manufacturers of.	
Shedden & Co., Newburgh, N. Y.	2

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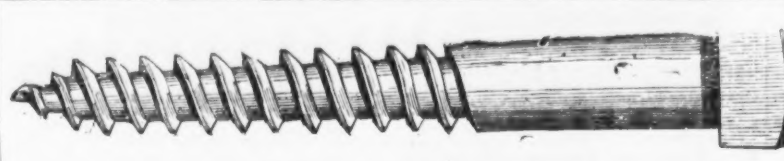
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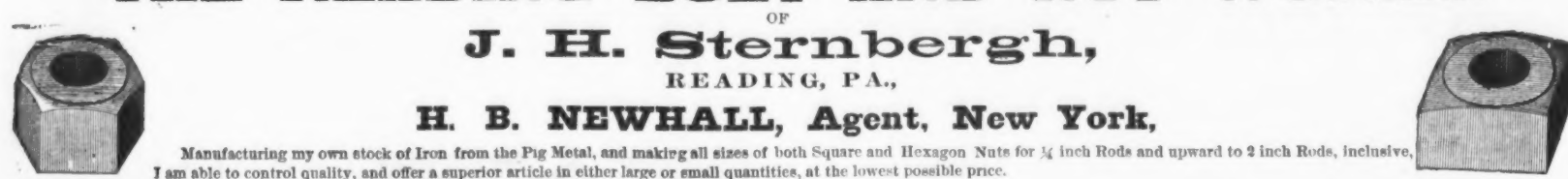
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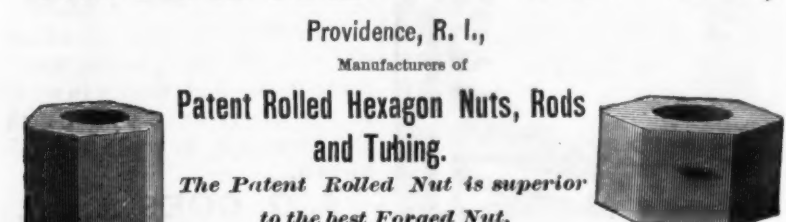
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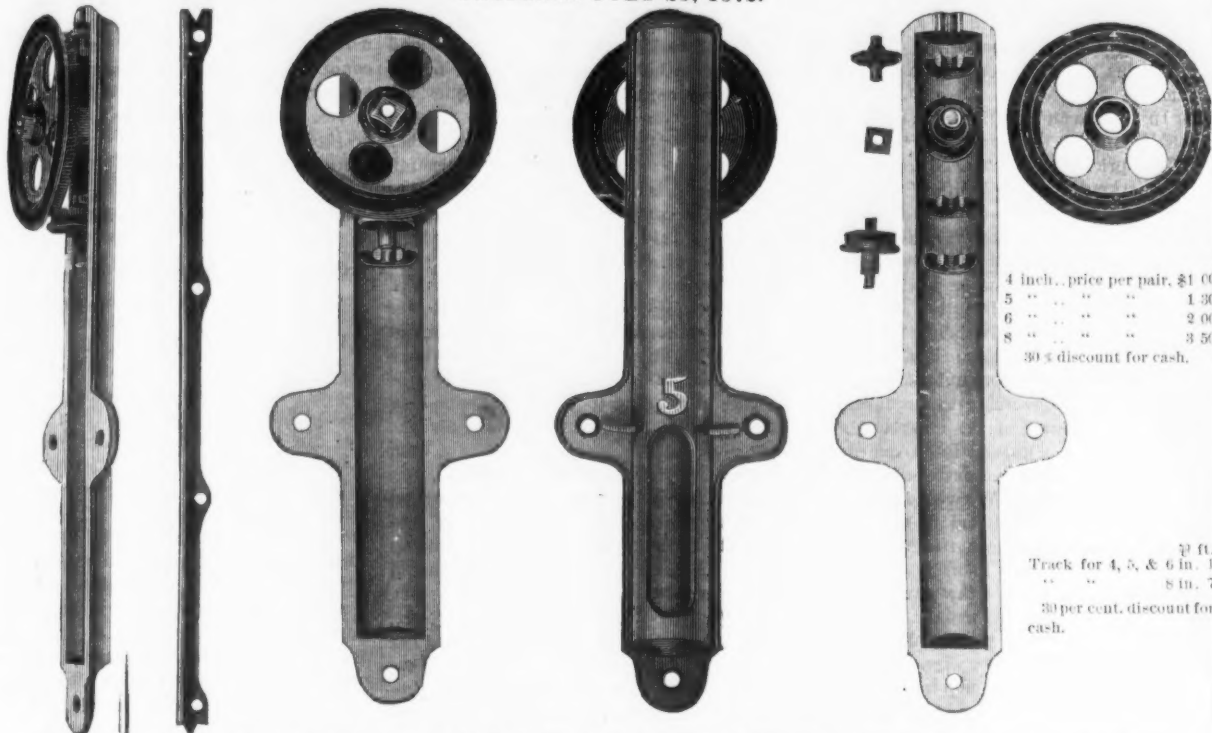
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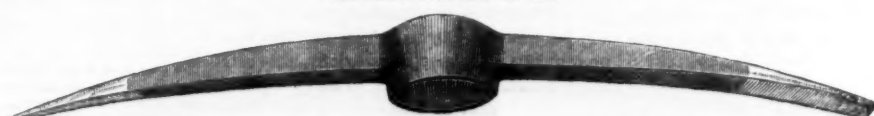


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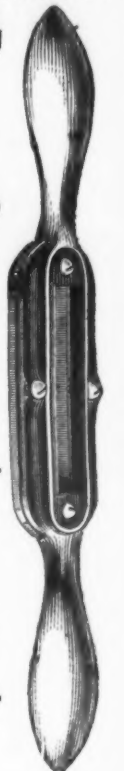
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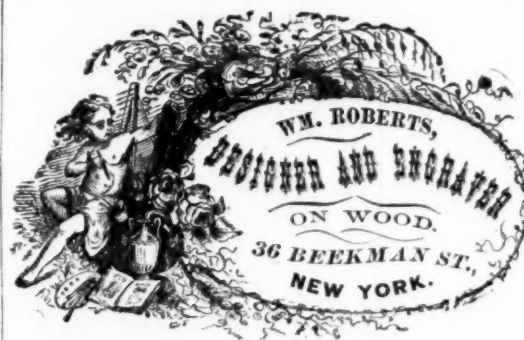
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CONTENTS.

First Page.—The Neville Furnace.
Third Page.—Rochussen and Daelen's Process
for Producing Steel Direct from the Ore. New Pat-
ents.
Fifth Page.—On the Molecular Changes Pro-
duced in Iron by Variations of Temperature.
Seventh Page.—The Metallurgical Features of
the Vienna Exposition.
Ninth Page.—Business Items.
Thirteenth Page.—The Iron Age Directory.
Sixteenth Page.—State of the Iron Trade at
Home and Abroad. Railway Enterprise in Asia and
Africa. Postal Cards and What they Suggest. Na-
tional Association of Stove Manufacturers. New
Publications. Scientific and Technical Notes.
Seventeenth Page.—Fire Escapes. A Self-Sup-
porting Fire Ladder.
Eighteenth Page.—Trade Report.
Nineteenth Page.—Trade Report (concluded).
Our English Letter.
Twenty-third Page.—New York Wholesale
Prices of Hardware and Metals.
Twenty-fourth Page.—New York Wholesale
Prices (concluded).
Twenty-seventh Page.—Philadelphia, Buffalo,
Boston and Pittsburgh Hardware and Metal Prices.
Twenty-ninth Page.—Chicago, Cincinnati, St.
Louis, and Detroit Hardware and Metal Prices.

State of the Iron Trade at Home and Abroad.

There seems to be in all the principal iron markets of the world, a tendency towards a healthy and natural reaction from the extreme high prices maintained for the past two years: not in the form of a sudden collapse of the market, but by a gradual and easy decline, resulting from the reestablishment of a more equitable relation between the demand for iron and the supply of it. The effect of high prices is always to restrict consumption, and although a present economy in the use of iron must ultimately be made good, a temporary check in the demand affords opportunity for the accumulation of stocks, from which to draw when, with lower prices resulting from such accumulations and a growing desire among producers to sell, the demand revives and becomes again active. Through such a period of reaction from extreme activity and high prices the iron trade of the world is now passing, and as high prices have everywhere stimulated production, there is reason to hope that the average of prices for the next few years will be somewhat lower than the average for the past two years.

In this country a general dullness in the iron trade is reported, in part due to the season, and in part to other causes. At this time of the year there is usually a light inquiry for iron, and buyers are now especially cautious, as the indications warrant the belief that the tendency of prices is downward. In the East makers have held out firmly at \$50 for No. 1 pig, and as they have made comparatively little of late, they are in a position to sustain the market, having but little more than they need to fill contracts. It is not difficult, however, to purchase from second hands at \$47 to \$49. Of other numbers of pig there is a good supply, with but a limited inquiry, and buyers find the market in their favor. In manufactured iron there is but little doing, and both makers and dealers complain of unprofitable dullness, but a comparison of our prices current, published on another page, with those for preceding weeks, will show that there has been no material decline in prices, as yet. Stocks of manufactured iron of all kinds, in this and neighboring markets, are much larger than at this time last year, and the probabilities are in favor of a gradual and easy decline. The general suspension of railroad construction

throughout the country, owing to the inability of the companies to market any considerable amount of their securities, contributes materially to the prevailing dullness in the iron trade, and as business has not yet recovered from the recent unprecedented stringency in money, a dull summer is anticipated.

In the Western iron trade, as represented by the Pittsburgh market, the situation is even less favorable. Pig iron is very dull, and makers generally complain that they are losing money at present prices. The great difficulty experienced by makers in the West is the high price of ore. Iron Mountain ores now cost \$10 per ton against \$5 to \$5.50 last spring, and Lake Superior \$13 to \$14 against \$9 to \$10 last year. Thus it will be seen that with ores about doubled in value, no reduction in fuel or labor, and pig iron from \$10 to \$12 lower than last year, producers are placed in a very uncomfortable position, from which they cannot immediately extricate themselves. Prices at Pittsburgh are said to just about cover the cost of production at the furnace, and the loss on transportation and handling amounts to about \$2 per ton. Our Pittsburgh correspondent reports that about one-third of the furnaces in the Mahoning and Shenango Valleys have gone out of blast, and that the rest will be obliged to suspend between this and the 1st of July, unless a marked and unexpected improvement should take place. Good standard Western mill irons are offered in Pittsburgh at \$38, but buyers are holding off for a further decline, and take only what they need for immediate consumption. Stocks are accumulating rapidly in the hands of commission men, and it is thought by some buyers that mill irons will be as low as \$35 before many weeks. The finished iron trade continues dull and unsatisfactory, and prices are gradually declining. The mills are selling considerably under card rates, and the nail makers offer similar concessions. While no immediate improvement can be expected, we think the dullness will not extend beyond the warm weather, if makers of pig iron are disposed to accommodate themselves to the changed condition of affairs. The disproportion between the production of iron and the demand for it no longer exists in a degree sufficient to warrant combinations among makers to maintain high prices, and if they will sell their iron for what it is worth they will enjoy the benefits of a continuous and steady demand, which is the only sound basis of a permanent prosperity. The country needs a great deal more iron than it has consumed during the past two years, and no lasting benefit ever accrued to the producers of any commodity from efforts to maintain prices at a point where consumption was checked. We do not think the policy of our Eastern furnace men during the past six or eight months has been a wise one, and we hope they will not be slow to recognize the fact that lower prices will immediately and permanently benefit trade.

In Great Britain an uneasy feeling pervades all branches of the iron trades. Prices have been pushed up to such a point as to be almost prohibitory for finished iron, and buyers are purchasing only what they immediately need. As in this country, though from somewhat different causes, there is an almost total suspension of railroad building, and general consumption is reduced to a minimum, which may be regarded as the natural consequence of forcing prices above their proper level. No "collapse" or "crisis" is apprehended, but a decline in prices is considered inevitable, and not until they have fallen at least £3 per ton is any improvement in trade anticipated. This reaction will be attended with many and important ultimate benefits to the trade. There is no doubt that when finished iron was much cheaper than now the business was much more remunerative than it is at the present time. It is evident, however, that the British iron masters are laboring under many and serious difficulties, and that the outlook is far from encouraging. The fuel question is one which no Parliamentary inquiry can answer satisfactorily, and their supplies of raw material of all kinds are so limited that it will be impossible to materially increase, on the average, the iron product of the country, however active the demands of the home and foreign markets. The *Iron and Coal Trade Review* admits that the make of iron in 1873 will not much, if any, exceed that of 1872, for while some districts are increasing their production, others are rapidly declining, with no prospect of recovery. As an indication of the condition of the ore market, it may be remarked that a cable dispatch from London, under date of May 29th, reports the arrival of ores from the United States at Wolverhampton, "in consequence" of the exorbitant rates at which native ores "are held." This importation was probably made with a view to frightening the ironstone miners, by holding before them the possibility of foreign competition; but the time is not far distant when our rich ores, especially from the Virginias and other dis-

tricts near the seaboard, can be brought into the country in large amount at a profit to both shippers and buyers. The same is true of coal, but it is scarcely probable that the British iron masters will be able to sustain for many years a successful competition with this country upon imported ores and fuel.

In France and Belgium the condition of affairs is much the same as in this country. High prices have checked consumption, and the markets are almost without buyers, and prices are tending steadily downward. Matters are rather more unfavorable in France than in Belgium, as in the former a number of important blast furnaces have suspended operations, with no intention of resuming until a change for the better takes place. A reaction from extreme prices, after a long period of unhealthy stimulation, is always temporarily unfavorable to producers, but with a restoration of the market to a normal condition, a general improvement and expansion of the iron industries of the Continent is expected. We would call the attention of those interested in the iron and metal trades of other countries to the varied and valuable foreign information, obtained from the most trustworthy private and official sources, published weekly, as a feature of our regular trade report. Much of this information could be obtained by dealers only at great expense and trouble, and we are pleased to notice that our enterprise in securing these valuable notes for publication is fully appreciated by our readers. Our regular reports by mail and telegraph include the iron and metal markets of Great Britain, France, Germany, Belgium, Austria, Russia, British India, the East Indies, China, Japan, Africa, Australia, and South America, and we think it but just to ourselves to say that no trade paper in any special field of journalism presents its readers with foreign advices covering as wide a range of useful information. We are constantly extending our correspondence, with a view to making this department even more comprehensive than it is at present, and dealers in iron and metals will find our condensations of official statistics, trade circulars, private letters and telegrams, &c., invaluable as a means of correctly forecasting the course of trade at home and abroad.

Railway Enterprise in Asia and Africa.

One of the most interesting of the great engineering problems now under discussion is the project of the indefatigable M. de Lesseps to build a railroad across the wastes of Central Asia. Ten years ago such a scheme would have been regarded as the dream of a madman, but now it is seriously discussed, and pronounced feasible by the best engineers of Europe. M. de Lesseps' plan proposes an extension of the present railway system of France to Orenburg, completing connection between Calais and the Central Asian border. From Orenburg the line will extend to Samarcand, the capital of Tamerlane, fifteen hundred miles; thence to Peshawar, on the borders of British India, eight hundred and fifty miles. From Peshawar to Calcutta, two thousand two hundred and fifty miles, railroad communication is already established, so that the work proposed, which will establish through railroad communication between Calcutta and Calais, consists in the construction of the railroad between Orenburg and Peshawar; and, formidable as this undertaking may seem, it is by no means impracticable in this era of great engineering achievements. The successful completion of the Suez Canal, in spite of difficulties which were very generally regarded as insurmountable, may be accepted as showing that M. de Lesseps is equal to the undertaking he proposes; and with the patronage and favor which has been extended to the project by the Czar of Russia, it is thought that he will have no great difficulty in securing adequate financial support for the enterprise, if undertaken. It is unnecessary at this time to speculate upon the results which would follow the establishment of such a road through the heart of Central Asia, but the work is one which, in the interest of civilization, we should be glad to see carried to a successful completion.

Among other interesting projects of a similar character may be mentioned the railroad proposed by the Shah of Persia, under the advice of Baron Reuter, who has secured a concession of the most comprehensive character. The Shah has granted to Baron Reuter, and to any company organized by him, the exclusive right to construct railways, tramways, and other public works throughout Persia, together with the exclusive right of working the mines and utilizing the forests of the country; and the exclusive right of working the railways for a period of seventy years. The land necessary will be given by the State so far as possible, and when private lands are required the Persian government undertakes to prevent exorbitant rates being charged, and will, if necessary, compel the owners to consent to a forced sale. The materials used are to be free from import duties, and all persons en-

gaged in the work will be exempt from taxation. In return for this the company is to pay the government 20 per cent. on the net profits of the working of the lines. The government is to receive 15 per cent. on the profits of working the coal, iron, copper and lead mines; but all gold and silver mines, and those containing precious stones, are reserved by the government. The right of making canals and reservoirs, and all other works connected with water communication and supply, is also granted on the same terms. The company is to farm the customs from May, 1874, for 25 years, and is to have preference of all other person in case of the establishment of a state bank, gas works, mills, telegraphs and mails. Baron Reuter is also authorized to negotiate a loan of \$30,000,000, on which the state guarantees an annual interest of 5 per cent., beside paying 2 per cent. to the agents who may negotiate it. No specific route for the principal railway proposed has yet been named, but it is believed that it will pass through Bagdad, and so establish connection with the projected Euphrates Railway, and with the Indian system by a line extending across Afghanistan or Beloochistan. Should these great works be completed, as they probably will within the next few years, it will not be long before the yet small, but growing, railway system of China will extend westward to meet the eastward progress of railroad construction in Central Asia, and then both shores of the Atlantic will be brought into railroad communication with both shores of the Pacific. These are startling indications of progress toward "the federation of the world" predicted by the poet, and show that "titanic forces" are already "taking birth in divers seasons, divers climes," which will carry the civilization of the new world among the dust and ruins of the old.

Another important enterprise is that proposed by the Khedive of Egypt, who seems determined to revive the glories of the Pharaohs while placing his hitherto neglected country in the line of progress. The Khedive contemplates the construction of a railroad to the heart of Central Africa, which shall extend to the fertile plains of Soudan. The engineer entrusted with the work of making the preliminary surveys has made his report, which may be briefly summarized as follows: He proposes to utilize the Nile as far as Wady Halfa, just below the second cataract, and more than 1000 miles above Alexandria. Vessels sailing up the Nile will pass the first cataract on carriages drawn up an incline by machinery operated by water power. Wady Halfa is to be the shipping port of Central Africa, and from thence the railroad will extend to Shandy, in Soudan, some 550 miles distant. Soudan is a country about twice as large as France, with a splendid climate and a soil capable of producing sugar, cotton, fruits and vegetables in tropical luxuriance, beside yielding gold, silver, ivory, spices, fine woods, feathers, and many other articles of great commercial value. The native population, numbering about 30,000,000, are still uncivilized, but are peaceable, and possess qualities which will make them industrious and tractable laborers under judicious supervision, and, in time, a thrifty and prosperous people. There is every reason to believe that this railroad will be undertaken at once, and with the support of the wealthy and enterprising Khedive, its success is certain.

Postal Cards and What they Suggest.

We have never looked with much favor upon the introduction of postal cards into this country, partly because the same accommodation might be extended to the public without involving any expense to the Department for engraving and printing—a plain white card, with a one cent stamp affixed to the corner, being to all intents and purposes as convenient and readily portable as one covered with scroll work and cheap ornamentation in chocolate colored ink; and partly because a postal card letter violates the confidence of correspondence, even when the message written upon it might, with propriety, be carried by a messenger and verbally delivered. But the public wanted postal cards and we are glad they have them, because they have set the people thinking and promise to give rise to a newspaper discussion of the subject of cheap postage which must ultimately lead to great and permanent reforms. The problem now presented to the people is briefly this: If the government can afford to carry a postal card to any part of the country and throw in the card for one cent, including carrier delivery in cities provided with a carrier service, why should it charge upon a letter of smaller size, and no greater weight, three cents, when the sender provides paper and envelope? Either the government can or cannot afford to transmit a postal card for one cent. If it cannot, it should not have tried the experiment; if it can, it can also afford to carry a letter weighing, say, a quarter of an ounce, for the same rate of postage charged upon a postal card which costs more to manufac-

ture than a stamp. If it can do this, Congress ought to pass a law at the earliest opportunity extending the benefits of cheap postage to those who prefer to enclose their letters in envelopes. This is already demanded by the press and people of the country, and unless the Postmaster General is prepared to prove that the postal card service is maintained at a loss, he will have no right to complain if Congress shall require him to carry letters for one-third the present rate of postage. Our experiences of the advantages of cheap postage are altogether in favor of the proposed reform.

National Association of Stove Manufacturers.—This association, which now very fully represents the stove manufacturing interests of the United States, holds its semi-annual convention at the Cataract House, Niagara Falls, beginning on Wednesday, June 18th. The beauty of the season, the natural attractions of the place chosen, and the importance of the business to be brought before the meeting, will probably attract a large attendance. The officers and members of the association claim that it has been of great benefit in promoting a better understanding and a greater harmony of action in the trade, and it is hoped that manufacturers who have not hitherto identified themselves with the association will attend the Niagara convention, and acquaint themselves with its purposes and practical workings.

New Publications.

THE COAL REGIONS OF AMERICA: THEIR TOPOGRAPHY, GEOLOGY AND DEVELOPMENT, &c. By James Macfarlane, A. M. New York, D. Appleton & Co. pp. 680.

From such hasty perusal as we have been able to give this volume, we have no hesitation in saying that it is the most valuable and comprehensive treatise on coal published since the appearance of Taylor's work, which, considering the limited materials at the command of the author, was a work of great merit. Mr. Macfarlane's work, though somewhat more restricted in its scope than that of Taylor, is, of course, more thorough, because of the greater range of exact information to which the author has had access. Its compilation, however, has been attended with many and serious difficulties. The State geological surveys, which are the basis of the work, are, in many instances, out of print and difficult of access. But the author has succeeded in collecting a great mass of useful and valuable information, and his book deserves to take rank at once as a standard work of reference until more thorough and accurate surveys shall have been undertaken, which will give to the compiler of such a work additional facts and more complete statistics.

The classification of the contents of Mr. Macfarlane's book is admirable. The four general varieties of American coal, Anthracite, Bituminous, Triassic and Cretaceous, constitute the four divisions of the subject, and those divisions are subdivided into chapters describing the coal measures of each State and important locality.

For the benefit of those who have but little knowledge of geology, some general information is given in an appendix relating to the origin of the coal beds and their place among the rocks. Twenty-four maps and charts explanatory of the text, and twenty-eight engravings illustrating subjects described, add to the interest of the book, and both compiler and publishers may be congratulated on the literary and mechanical excellence of the work.

THE AMERICAN GRAMMER'S HAND BOOK: A popular and practical treatise on the Art of Imitating Colored and Fancy Woods, &c. New York, John W. Masury & Son.

This little work deserves commendation for the unusual beauty of its oil color plates, showing the proper methods of graining to produce good imitations of ash, black walnut, bird's eye maple, dark oak, light oak, mahogany, rosewood and satinwood. The accompanying text will be found to contain many suggestions of great value to the practical painter, especially to the beginner, who is with much truth assured at the outset that, while he may learn something from a treatise on graining, skill in the art can only be acquired by intelligent study and careful practice. The book is of unusual typographical beauty, and gives evidence of much care in its preparation.

Scientific and Technical Notes.

The American Exchange and Review, speaking of the use of

FLUORINE AND SODIUM FOR COLD SHORT PIG, says: An experiment in removing phosphorus from iron during the puddling process, by treatment with a small percentage of fluorspar in the puddling furnace, is announced as having been eminently successful at the iron works at Thale, in the Harz. The difference of opinion amongst metallurgists concerning the efficacy of "medicines" of any kind are well known; but any well authenticated results which have been obtained with their employment warrant careful attention. In the case here referred to the pig iron used in the conversion was of the brand known as Haeder, which ranks amongst the worst of the German irons, in virtue of its noticeable percentage of sulphur and of phosphorus. The iron was puddled along with about 1½ per cent. of fluorspar, and the product is said to have been a fibrous iron, which, when rolled, did not exhibit the slightest traces of being cold short. A novel application of sodium has been suggested by M. M. Girard and Toulain, who propose to conduct the vapors of sodium or potassium into molten pig iron, and then decomposing the alloy thus obtained by means of a blast of air. It has been asserted by Springmühl that by the addition of sodium to molten iron in a crucible, and lixivation of the product in water, a very pure and soft iron may be obtained, which, on a second melting, loses its porosity. It has been stated by experts that, in the event of any large demand ensuing for sodium, it can be prepared in quantities at a cost but little, if any, greater than that of dis-

tilling metallic zinc. But it will be a long time before it can be expected to be used in iron metallurgy, even if it should improve the quality of the pig, which yet remains to be demonstrated.

At a recent meeting of the Institution of Mechanical Engineers, a paper was read by Mr. F. W. Kitson, of Leeds, on

THE ALLEN GOVERNOR FOR STEAM ENGINES, from which we condense the following: This governor has been in use for nearly a year on several engines at the writer's works, and in one of these, driving a steel tyre rolling mill, an increase of 400 horse-power suddenly takes place, and is suddenly thrown off in the course of the work. It is found to control the engine completely without any change of speed being perceptible, the stop valve being left full open throughout. This governor is driven by gearing, so as to avoid any risk of accident from a belt slipping. With the ordinary Watt governor, previously used in this case, it was necessary for the engineer always to stand by the throttle valve, and handle it whilst rolling a tyre, to prevent the engine being pulled up by the increased resistance, or running away after the tyre was rolled. In order to prevent any tendency of the governor to overrun when changing its position, the weight is suspended from a spiral, which increases its leverage when wound up to the highest position, and diminishes its leverage at the lowest position, so as to cause the governor in each case to return at once to its correct position. The means of readily changing the working speed of the engine is given by adding or removing a portion of the suspended weight, which is made in segments for this purpose. A balanced throttle valve is employed with this governor, consisting of a hollow double seat valve, which has the two seats cylindrical, and of equal diameter, and offers very little resistance to any change of position, and the governor is connected directly to it by a pinion working into a toothed sector. The governor is at work at several iron works, paper mills, and cotton mills, and is found to work without any trouble in keeping in order, or maintaining the oil supply, and to give very satisfactory results.

Admiral Touchard has lately published in the *Revue Maritime*, a discussion of the question of BUILDING WAR VESSELS WITH LIGHTER ARMAMENT,

which merit the attention of naval architects. The Admiral commences his discussion of the subject by showing that every navy must consist of at least three types of vessels—the ship of the line, the ship for coast defense, and the cruiser. The ship of the line should, on the one hand, be capable of conducting operations at a distance, and, consequently, of making long voyages, and, on the other, should combine in itself the maximum of offensive and defensive power. In two words, it should be capable of navigating and of fighting. The coast defense ship is, par excellence, of the monitor form, and such a vessel, with certain modifications to ensure a safe range of stability, might be employed upon any of the European seas; it might even, with a sufficient supply of fuel, cross the Atlantic, as the *Devastation* is intended to do, but, at the same time, its action is perfectly limited and defined. The monitor can never be a seagoing vessel; it cannot even be effectually employed for blockading an enemy's coast. The cruiser has two duties to perform: to ruin an enemy's commerce, and to engage his cruisers whenever it meets them. In times of peace it is essentially a ship for foreign stations, and may be of all classes, from the frigate and corvette to the dispatch boat. It should have great speed, under steam, and fair speed under sail, while there is no necessity for it to be protected with armor. Having thus defined the constituent elements of a navy, Admiral Touchard proceeds to show why it is that the ship of the line does not require that complete armor protection which is now given to it. He first details the successive increase in size of guns and thickness of armor, and then puts the question—admitting that a ship can be built to carry armor of a certain thickness as an extreme limit, and that such armor is penetrable, what is the consequence? Imagine an enormous projectile entering the central battery, and exploding there, driving before it a murderous cone of debris of wood and iron; in such a restricted space, with numbers of men pressing around the guns, probably not a single being would remain alive. Under such circumstances—and they are sure sooner or later to occur—the armor would be rather a danger than a protection.

Suppose now a ship, instead of having her guns concentrated in a central battery, where, owing to the narrowness of the ports and the thickness of the side, it is very difficult to properly point them—has them mounted *en barbette* on central turntables, so that they may command the whole horizon with, say, a thin shield to protect the gunners from the effects of musketry. Thus carried, the guns could be properly laid on the object of attack, and pointed in whatever direction their fire might be required. Moreover, by getting rid of the armor plated battery, we should bring about an enormous economy of weight, which would enable us to shorten the vessel, and thus render her more handy, besides decreasing her cost. It must be understood that Admiral Touchard is no advocate for the entire abandonment of armor. What he maintains is, that we should protect the vital parts of the ship—the water-line, engines, and magazines—and employ transverse armor plated bulkheads to prevent her being raked when fighting end on; but that we should stop there. Don't, he says, encumber with armored sides a ship of the line, with which the naval battles of the future will have to be fought, at a range of 1000 yards or so—a range at which any armor will be penetrable; the sacrifices, unless the protection be really efficacious, which it is not, are too great.

Experience in English coal mines has demonstrated that

EXPLOSIONS OF FIRE DAMP CAUSED BY SAFETY LAMPS

are not uncommon, even when the flame is not exposed. Mr. Dickinson, Inspector of Mines, in his testimony before the coroner's jury at the inquest of a miner killed some time ago by an explosion at the Deamon Colliery, Barnsley, said he went down the pit on the day following the explosion, and examined the place where the lamps were found. For about 12 or 15 yards along the working face the floor was ripped up, and gas was still pouring out at a considerable rate and firing in the lamp. There was no doubt that the gas came from this rent, that it was a sudden outburst, and that the gas, mixing with the air in the return airway, passed over the men's lamps at such a velocity that it fired through the gauze. From experiments which he had seen made, fire-damp would, under such circumstances, fire through the Davy lamp without any difficulty. At a velocity of from 450 feet to 500 feet per minute, or 5 feet per second, an explosive mixture would pass through the safety lamp, which then ceased to be any protection; and the men, unless they had a canister or some water, or some means of smothering it, were perfectly powerless. The owner of the mine had since undertaken to have a canister ready in the event of the men being overtaken in this way. He (Mr. Dickinson) examined the safety lamps; they were of the ordinary description used throughout the county; one had 26 parallel wires to the inch, and the other 28; 28 was the standard mesh, but the standard mesh would fire at the velocities he had named.

Fire Escapes.

BY JAMES A. WHITNEY, M. E.

The other day I saw a man fasten a long, flat metal strap to the window sill of the fourth story of a Broadway building, and then, by some occult device not apparent to the spectators below, descend to the sidewalk. The apparatus was designated as a fire escape, and its experimental use sufficed to recall the hundred and one projects that, here and abroad, during the past half century and more, have been brought forward to aid the escape, amid hurry and confusion, of people endangered in the upper portions of burning buildings. A dozen or fifteen years since the city of New York paid \$25,000 for a combination of hoisting ladders, mounted on wheels and intended to be managed by firemen. But this has not displaced the old-time hook and ladder appliances; neither has any one of half a dozen apparatus made on a similar plan since then. Indeed, to be of any general utility, the fire escape must be a fixture in one way or another of the structure where its employment is looked for, and it must, furthermore, be simple in construction, compact in form, and capable of operation with a minimum of self-possession, common sense, and daring, on the part of those making use of it. That a safety device for dwellings and other buildings may be provided, embodying these essentials, is quite within the reach of probability, but after some thought upon the subject I am constrained to believe that the forgotten inventions of a comparatively remote time in the history of modern mechanical improvements afford better models for imitation and elaboration than those more recently suggested.

Sixty or seventy years ago the occurrence of several severe fires in the cities of Great Britain brought the attention of projectors to bear upon the construction of improved fire escapes, some of them differing but slightly from those constructed here within the past two decades. Among these was that of John Davis, in 1810, which comprised a series of sectional ladders mounted upon a cart, and capable of elongation, in telescopic fashion, to reach the upper stories of buildings. At the bottom of the lower section was a windlass, and at the top of the upper a pulley. A rope passed from the former to the latter and carried at its extremity a box, bag, or basket, capable of being raised or lowered by the turning of the windlass, which was accomplished by a crank. The apparatus was to be used as an adjunct of the fire department, being run from place to place like a fire engine. When in operation, the ladders afforded access to upper stories, and the box or carrier provided a means of lowering persons too weak or too terrified to descend by the rounds of the ladder. Three years after this a much more compact ladder was devised by Thomas Roberts. It consisted of a great number of short sections, jointed together, in the manner of a fishing rod, but with the ends of adjacent sections connected by strong cords. At the top of the jointed pole thus constituted was a hook for grasping the window sill to which it was necessary, in any given case, to ascend. This done, the operation of disjoining the pole was commenced at the bottom, the sections, as fast as separated, took a horizontal position, being suspended from the cords. The operator thus, gradually mounting, finally brought the whole to the condition of a rope ladder, the cords forming the sides and the sections the rounds thereof.

In 1816 James Braby's fire escape was brought forward, and attracted considerable notice. This consisted simply in a pole of sufficient length, having at its front a board or plank, the front or face of which was rabbeted to provide a guide for a car moved up and down by a band attached to a drum at the bottom of the pole, and extended over a pulley at the top. This was, of course, to be worked by firemen, and, once in place, afforded a fair chance of escape to the inmates of an endangered building. In 1821 the London Society of Arts paid a premium of ten guineas to George Adams Witty for a fire escape intended to constitute a portion of the ordinary furniture of a dwelling, its external form being that of a settee. As concerns its mechanical construction, it comprised a framework capable of being hooked upon, and projected from, the window sill, and carrying a drum, or windlass, the rope from which was furnished at its free extremity with a basket large enough to hold one or more persons. The drum could be operated either by the occupant of the basket holding upon a counter rope, or by a person on the ground performing the same function. Provided sufficient coolness could always be found in parties hurrying for their lives, this principle could be made to provide a very efficient means of safety. A light iron frame could support the whole, and a strap brake applied to an unwinding drum in the basket or car would furnish an efficient means of regulating the velocity of the descent.

In 1831 the same association awarded its large silver medal to J. Brandwood, of Edinburgh, for a fire escape which, in the language of the inventor, comprised:

"A single chain eighty feet long; eighteen ounces weight to the yard.

"A chain ladder of the same length, with claws for hooking to windows, roofs, &c.

"A small pulley, with claw attached, and a rope roved through it strong enough to bear the weight of the ladder.

"A strong steel cross-bow, with some coils of fine cord, each of which has a three ounce bullet attached.

"A strong canvas bag, capable of holding at least one person, and capable of being let down by the chain of firemen." The cross-bow was to shoot a cord, the cord was to draw the ladder until it hooked on window or roof, the ladder was to enable the fireman to ascend, and the fireman was to put the panic-stricken into the bag and let them softly down to terra firma. That a prize was awarded to the contrivance proves the great importance attached to the subject rather than the utility of the thing itself, or the mechanical judgment of those who sat in consideration upon its merits. The previous year the society had voted the large silver medal and ten guineas to John Hensley for a ladder carried on a truck, and so contrived as to be wound up in a bundle when not in use, and unwound and lifted like a Pharaoh serpent when required to be put in operation. About the same time another projector devised a fire escape consisting of a platform designed to be belted by a gigantic system of tongs, provided with rounds to form zig-zag ladders when the platform was raised.

The platform was raised.

A Self-Supporting Fire Ladder.

About four years ago Paolo Porta invented at Milan, Italy, a self-supporting ladder of great simplicity, strength and utility. It has been adopted by the fire departments of Milan, Florence, Genoa, Naples, and other Italian cities. M. Belle Scott-Uda has taken out rights on the invention for Great Britain and the United States; and after two or three preliminary private trials, it was publicly tested in front of the new Court House at 3 p. m. on Thursday last. The ladders are made in sections about 12 feet long, and the lowest section is attached to an apparatus on the truck by which it can be elevated to any required angle.

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The remaining sections are attached one after another to this, and a windlass then hoists the lower section, and with it the rest. By an arrangement of iron rods at either side of the ladders, a balustrade is raised along the ladders which gives to the combination its great strength. The specimens exhibited on Thursday were 70 and 125 feet long. The latter was put together in about 1½ minutes, and rapidly drawn up to the required angle, where it sustained, without strain, six or eight men distributed along its length. One man, near the top of this, was let down with the ladder, the structure standing readily the strain of the leverage. Several minutes were occupied in throwing the long ladder together and drawing it up. When the firemen mounted to its summit the spectacle was a fearful one, but the ladder without the strain. A canvas bag, or basket, was hoisted by means of rope and tackle nearly to the summit, and the truck was wheeled around and the man landed on the roof of the City Hall. A hose was also carried nearly to the top of the ladder, and a stream of water thrown upon the roof of the new Court House. In trying a similar experiment with the smaller ladder, it was drawn up too near to the perpendicular, and the hose bent the ladder over backward, and precipitated a fireman, Dennis J. O'Leary, of Engine No. 31, to the ground, without inflicting serious injury. The firemen and Chas. O. Shady, assistant chief engineer, admit that the accident resulted from their carelessness, and not from defectiveness in the ladder.

Experts state that the apparatus is capable of great improvement, but that the idea is a valuable one. The longest combination ladders used by the hook and ladder companies of the city are about 80 feet, are much more clumsily put together, and have to depend on walls which are often insecure for their support, from which necessity serious accidents often occur, as was the case at the great Boston fire. The ladder is also said to be useful in the place of scaffolding in many cases, especially where crumbling walls, chimneys, &c., have to be demolished.

Special Notices.

BANKING HOUSE OF FISK & HATCH.

No. 5 NASSAU ST., NEW YORK, June 11, 1873.

We recommend to our friends and customers, for investment of surplus Capital, or in exchange for Government Bonds, which can now be sold at unusually high prices, the following Securities of well-known character and established reputation, viz:

THE

Chesapeake & Ohio 6 Per Cent. Bonds.

Principal and Interest payable in Gold Coin in New York City; Interest payable May 1 and November 1; Issued in denominations of \$100, \$500 and \$1000, either Coupon or Registered—Price 88½ and accrued interest.

ALSO, THE

Chesapeake & Ohio 7 Per Cent. Bonds.

Principal and Interest payable in Gold Coin in New York City; Interest payable January 1 and July 1. Bonds of \$1000 each, Coupon or Registered—Price, 90 and accrued interest.

The Chesapeake and Ohio Railroad is completed and in operation from Richmond to the Ohio River, a distance of 420 miles, at a cost, with the equipment, of over \$35,000,000, and the rapid development of its business indicates that the earnings for the ensuing twelve months will not be less than \$3,000,000 and for the succeeding year not less than \$5,000,000.

Pamphlets containing full information concerning the road and the country it traverses will be furnished upon application.

We also deal in Government Bonds, Central and Western Pacific, and other first-class Securities, receive deposits on which we allow four per cent. interest, make collections and do a general Banking business.

FISK & HATCH.

R. T. HAZELL, AUCTIONEER.

By R. T. Hazell & Co.,

Store No. 115 Chambers Street.

Our REGULAR SALES OF HARDWARE, CUT LERY, FANCY GOODS, &c., will be held on TUESDAYS and FRIDAYS throughout the season. CASH ADVANCES made on CONSIGNMENTS without additional charge.

MANUFACTURERS

desirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "IRON," published every Saturday, at 99 Cannon Street, London, E. C.

SCALE: First 3 lines, 3s.; every additional line, 10d. Price, 6d. per Copy, or 30s. per annum, inclusive of postage to the United States.

STERLING IRON & RAILWAY CO.

MAKERS OF

STERLING ANTHRACITE PIG IRON

FOR FORGE AND FOUNDRY USE.

A. W. HUMPHREYS, Treas.,
42, PINE ST., N. Y.

Translations and Condensations.

The undersigned, commercial Editor of *El Cronista*, the Spanish Government paper in this city, and Foreign Editor and Translator of the *Daily Bulletin*, has made it a specialty for years past to translate industrial matter, with the strictest adherence to the technical wording, from and into English, German, Spanish and French, for manufacturers, patentees and others, and begs to be recommended to the iron masters and trade in that capacity. C. KIRCHHOFF, Box 2806, Post Office. Latest Publications translated by C. KIRCHHOFF. "German Imperial Consular Instructions." "Cuba may become independent." Officially endorsed by the governments of Germany and Spain.

Special Notices.

Wanted.

Hardware Salesman.

One who is active, intelligent and well acquainted with city trade. Also, **Entry Clerk**. One experienced in Hardware. Address, stating amount of salary expected, **WHOLESALE HARDWARE,** Office of *The Iron Age*, 10 Warren St., N. Y.

Employment Wanted

By a first-class Roll Turner, recently from England. Address **JAMES SKEROIS,** care of Mr. Joseph Jackson, Fair Haven, Conn.

Wanted,

A situation in Builders' and House Furnishing Hardware, by a young man experienced in city trade. Good reference. Address **H. C. P.,** Office of *The Iron Age*, 10 Warren Street, N. Y.

Wanted,

Traveling agent to sell small line of Hardware on commission. Will not interfere with sale of other goods. Address **Q. S.,** office of *The Iron Age*, 10 Warren Street, N. Y.

A party with long experience and with means wishes to associate himself with an established Wholesale Hardware House, in this city.

Undoubted reference given, and all communications held strictly confidential. Address **S. T.,** Office of *The Iron Age*, 10 Warren St., N. Y.

May 29th, 1873.

WANTED.—By an old established firm, a foreman fully competent to take charge of a Mill to roll small Merchant Iron or Wire Rods.

Address, with references, **C. K. HILL,** P. O. Box 3240, New York City.

Wanted.—Corrugating Machine

For corrugating Galvanized Sheet Iron of all sizes. Send price and description of machine.

Also, Wanted,

Set of Reels for winding wire from Galvanizing Pot. Address **Corrugating Machine,** Office of *The Iron Age*, 10 Warren St., N. Y.

"ENGINEERING,"

A Weekly Illustrated Journal, edited by **W. H. MAW AND JAMES DREDGE.**

OFFICES, 187 Bedford St., Strand, London, W. C. 152 Broadway, New York.

GEO. ED. HARDING, C. E.,

Representative in United States.

This most successful English Engineering Journal, containing thirty-six pages, weekly, illustrating the latest advances in Civil, Mechanical, Mining and Military Engineering Science, both in Europe and America, can now be obtained by American subscribers, post paid, for \$8.00, currency, per year, sent to the New York office of the Journal. All the important details of the buildings and novel machinery at the great Vienna Exposition will be illustrated and described in *Engineering* the current year; and this, with illustrations of all the larger American engineering structures, will render it invaluable to every American Engineer, Architect, Iron Master and Mechanist. The best medium for advertising American Machinery to the attention of European capitalists. Send for specimen copy, free.

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addressed to reach the

HARDWARE

and other lines of trade throughout the

UNITED STATES.

Names of parties in various business selected with a view to their Mercantile Standing.

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Hardware and Kindred Interests, **MACHINERY** and Kindred Interests.

Very desirable advertising mediums to all interested in these trades.

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Our only authorized Agents to collect money for any thing connected with our publications will invariably be provided with a letter of authority, specifying the particular object for which it is given, and bearing our official seal, and signed by the Manager.

The Merchants and Manufacturers Agency, 4 Warren Street, N. Y.

The Journal of the Iron and Steel Institute.

Containing Proceedings of the Institute; Original Communications bearing upon matters connected with the Iron and Steel Trades; Reports on the progress of the Iron and Steel Industries in foreign parts by the Foreign Secretary (Mr. David Forbes, F. R. S.); Notes on the British Iron and Steel Trades; Statistical information, &c., &c. Can be obtained from the publishers, Messrs. E. & F. N. SPON, Charing Cross, London. Price, 5s. each number. Nine numbers have been issued, and all except Number 1 (1871), which is out of print, can be supplied. The next number of the Journal will be published in a short time.

JNO. JONES, General Secretary. ROYAL EXCHANGE, Middlesbrough, May 22, 1873.

Manufacturers of PATENT ARTICLES

which are of real merit, and sold to

Hardware or Tin and Stove Dealers,

can make arrangements with a man who knows how to sell them, by addressing

Charles Gooch,

Cincinnati, Ohio.

Special Notices.

NOW READY.

"The Net Discounted Bolt List," PRINTED ON A CARD.

15 Discounts (from 25 to 70), warranted correct. Price 75 cents each. Address

KINGSLEY BROS., 119 Franklin Street, Buffalo, N. Y.

IF YOU WANT

to make your sales for

Hay, Straw and Stalk Cutters ten times larger than ever before, get the **Copper Strip Junior.** Circulars free.

WARREN GALE, Chicopee Falls, Mass.

To INVENTORS AND MANUFACTURERS

The Managers of the 42d Exhibition of the American Institute, of the City of New York, beg to announce, that the Exhibition Buildings on 2d and 3d Avenues and 63d and 64th Streets, will be open for the reception of heavy Machinery August 15th and for other articles, September 1st 1873. The Exhibition will be formally opened September 10th.

For particulars, address "General Superintendent, American Institute, New York."

For Sale, &c.

HARDWARE STORE

For Sale.

We offer our stock and fixtures on good terms. We have a well established, large and paying business—sales last year nearly \$30,000.

THOS. MILLER & CO., Burlington, Iowa.

Machinery For Sale.

We have for sale at reduced Prices a large lot of

Second-Hand Machinery,

among which are *Milling, Stocking, Nut Boring Machines, Quick Running Smooth Boring Machines, Punch Press, four Spindle Drilling Presses, eight foot Wood Planer, &c., &c., &c.*

Send for Catalogue to

Sharps Rifle Mfg. Co.,

Hartford, Conn.

Valuable Iron Works, For Sale.

The undersigned offers for sale the Iron Works in Pottsville, Schuylkill County, Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry,

Brick Pattern House, Erecting Shop, Stone Blacksmith Shop, Brick Office, and Lot of Ground containing in front 195 feet 3 inches, and in depth 260 feet.

There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flasks and Heavy Core Spindles for making heavy Castings and Pipes of all sizes; Turning and Planing Tools.

The Works can be put in immediate operation. A favorable opportunity is here presented for enterprising men. The demand for Castings and Machinery is constantly increasing in this region. The property will be sold on liberal terms. If not sold in a reasonable time it will be for Rent.

For particulars apply to **J. W. ROSEBERRY, Trustee,** Pottsville, Pa.

Rolling Mills For Sale or Lease.

The "CALVERT ROLLING MILLS," situated in the city of Baltimore, were withdrawn from the sale advertised on the 16th of May, and are now offered at private sale, or will be leased to responsible parties. The terms will be made advantageous. The Mills are in perfect order, and can be put in operation at short notice.

For full information address

ALEX. BROWN & SONS, Baltimore.

For Sale or To Lease.

A new Foundry, situated in Peckskill, Westchester Co., N. Y., with a good water front. Terms easy. Inquire of

A. R. FREE,

Peckskill, N. Y.

For Sale or To Let.

The Stove Foundry lately occupied by Munell & Thompson, situated at Elizabethport, N. J., can be adapted to any manufacturing purpose, having coal and iron within one block, direct from the mines. Communication with New York 32 times a day by rail, and 4 times by steamboat. Within half a block of the river. Will be let for one or more terms of years. Apply to or address

A. PAIZ & CO., 32 Broadway, N. Y.

Rolling Mill Machinery For Sale

One train, 3 high, finishing rolls, with steam engine 75 H. P.; and balance wheel, 20,000 lbs.—complete and in good order—by

Fearing, Rodman & Swift,

23 & 25 Commercial Street, Boston. Boston, Nov. 10, 1872.

Patent Right For Sale.

The undersigned desires to dispose of his patent for Feed Water Heater; or would sell State Rights for same, or the right to manufacture under a royalty. Address **GEO. WALES,**

Brooklyn Brass and Copper Mills, Brooklyn, N. Y.

Hardware Store For Sale.

Stock consists of a well assorted stock

Trade Report.

OFFICE OF THE IRON AGE.
WEDNESDAY EVENING, June 11, 1873.

In this season of almost unprecedented dullness, there is but little of interest to note in Wall street. The most important event of the week was the call of Secretary Richardson for \$20,000,000 of 5-20 bonds on which interest ceases September 6th. Of these \$16,000,000 are coupon issues, and \$4,000,000 registered; making, with preceding calls, \$70,000,000 thus far converted by the syndicate into new 5 per cents.

During the week the money market has worked easy, with rates on call loans averaging 4 @ 5 per cent. Mercantile paper has been in good demand at 6 1/2 @ 7 1/2 for short date.

The gold market has been very quiet, with but little speculation, and that little not very active. As will be seen from the following table, the premium has fluctuated within narrow limits:

Thursday Highest. Lowest.
Friday 117 1/2 117 1/2
Saturday 117 1/2 117 1/2
Monday 117 1/2 117 1/2
Tuesday 117 1/2 117 1/2
Wednesday 117 1/2 117 1/2

In the stock market there has been but little doing, and all the most active shares ruled lower than the average of last week. The principal dealings have been in Pacific Mail, Ohio and Mississippi, Western Union, N. Y. Central, Union Pacific and C. C. and I. C. Miscellaneous shares have been dull. The highest and lowest of to-day's quotations on change are given below.

The call of the Treasury, noted above, had the effect of advancing government bonds, and during the week the market has been strong. There has been a good demand from foreign bankers buying on account of English investors, who seem to have a better opinion of government securities than for some time past. Railway bonds have been strong, and those on completed, interest-paying roads firmly held; but there is little demand for the bonds of new enterprises, and railroad construction is generally suspended in consequence. It is estimated that the total mileage added to the railway system of the country this year will fall short of the expectations of statisticians, as published in January and February last, by about a thousand miles. The closing prices of governments are given below.

The foreign trade movements of the week are shown by the following tables:

Imports. 1871. 1872. 1873.
Tot. for week. \$7,410,146 \$6,182,599 \$6,383,231
Prev. reported. 163,015,643 196,307,452 181,364,519
Since Jan. 1. \$170,425,789 \$302,330,451 \$192,646,810

Included in the figures of general merchandise for the week are:

	Quant.	Value.
Animals.....	235	\$2,800
Brass goods.....	10	1,041
Bronzes.....	34	4,239
Chains and anchors.....	84	4,204
Copper.....	37	4,363
Cutlery.....	100	29,686
Guns.....	114	7,111
Hardware.....	37	4,363
Iron, pigs, tons.....	912	40,192
Iron, sheet, tons.....	30,840	187,887
R. R. cars.....	1,823	184,138
Iron cotton ties.....	621	2,187
Iron, other, tons.....	1,471	37,605
Lead, pigs.....	3,323	30,265
Metal goods.....	11	1,335
Nails.....	31	983
Needles.....	15	7,864
Old metal.....	8	334
Platinum.....	1	1,779
Per. caps.....	3	474
Saddlery.....	8	1,434
Steel.....	3,700	59,708
Silverware.....	1	33
Tin, boxes.....	30,840	187,887
Tin, cans.....	49,627	13,915
Wire.....	389	10,083

Exports, exclusive of specie.

For the week..... \$4,547,763 \$3,831,742 \$3,614,962
Prev. reported..... 97,088,000 85,540,185 116,725,078
Since Jan. 1..... \$101,616,441 \$92,371,927 \$122,340,070

Exports of specie.

Total for the week..... \$2,158,848
Previously reported..... 20,314,817
Total since January 1, 1873..... \$22,473,660

The bank statement shows that the banks now hold \$10,815,325 lawful money above a 25 per cent. reserve, which is again over last week of \$5,886,235. This assures a very easy money market during the summer. The national banks have a percentage of reserve to liabilities of 29.70, the State banks of 27.82. The average of both classes of banks is 29.47, which is a much stronger exhibit than we have had for many months past. The following is a comparison of the averages of the past two weeks:

	May 31.	June 7.	Differences.
Loans.....	\$277,968,800	\$277,418,800	Dec. \$550,000
Specie.....	19,482,000	23,984,800	Inc. 4,502,800
Circulation.....	37,447,100	37,484,100	Dec. 3,000
Deposits.....	208,136,500	214,475,900	Inc. 6,339,400
Leg. Ten.....	44,333,000	45,308,000	Inc. 975,000

Government bonds at the close were firm.

	Bid.	Asked.
U. S. Currency 6s.....	114 1/2	114 3/4
U. S. 6s, 1881, reg.....	116	116 1/2
U. S. 6s, 1881, c.....	116 1/2	117
U. S. 6s, 5-20 reg. May and Nov.....	117	117 1/2
U. S. 6s, 1865, c.....	117 1/2	117 3/4
U. S. 5-20 1874, c.....	117 1/2	117 3/4
U. S. 5-20 1865, c.....	117 1/2	117 3/4
U. S. 5-20 1867, r. Jan. and July.....	116 1/2	116 3/4
U. S. 5-20 1865, c. Jan. and July.....	116 1/2	116 3/4
U. S. 6-30 c. 1867.....	121 1/2	121 3/4
U. S. 6-30 c. 1868.....	121 1/2	121 3/4
U. S. 10-40 reg.....	112 1/2	113
U. S. 10-40 c.....	114 1/2	115
U. S. 5s 1881 con.....	115 1/2	115 3/4

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated.....	100 1/2	100 1/4
Lake Shore.....	91 1/2	91 1/4
Rock Island.....	106 1/2	106 1/4
Del. Lack and Western.....	60	59 1/2
Western Union Telegraph.....	82 1/2	82 1/4
Milwaukee & St. Paul.....	51 1/2	51 1/4
Pacific Mail.....	63 1/2	63 1/4
Erie.....	37 1/2	37 1/4
Ohio & Mississippi.....	27 1/2	27 1/4
Union Pacific.....	28 1/2	28 1/4
C. & I. C.....	29 1/2	29 1/4
Han and St. Joseph.....	24 1/2	24 1/4
Maryland Coal.....	34 1/2	34 1/4

GENERAL HARDWARE.

Trade, although dull and inactive, bears favorable comparison with the same period in former years, and we hear few complaints. Gray's Door and Gate Springs have been reduced to \$90 per gross, less discount 40 per cent., formerly \$84, discount 25 per cent. The Russell & Erwin Mfg. Co. will furnish on application their Appendix to Bronze Price List of 1870, giving illustrations of new goods and prices. They will also offer to the trade for the coming season a new line of Padlocks with patent steel keys, nickel plated, the list of which is not yet published.

On the 5th inst. the stockholders of The John Russell Cutlery Company held a meeting in Lowell, Mass. The new stock was all taken by the stockholders of the old company, and the money, which is all provided, will be paid in within a week. This company, as our readers are aware, was organized to purchase and succeed the John Russell Mfg. Co. The following are the officers: President, Joseph H. Ely, Lowell; Directors, H. M. Whitney, Lawrence; J. H. Ely, Lowell; Thomas Talbot, North Billerica; Horace C. Wilcox, Meriden, Conn.; Oliver Ames, 2d, North Easton; Alvah Crocker, Fitchburg; Matthew Chapman, Greenfield; Edwin Bulkley, New York; Treasurer, D. G. C. Field, Lowell; Clerk, Frederick Clapp, Greenfield.

James E. Halsey, 76 Reade street, has issued the following list of Bronze Hardware, manufactured by the Golden Bronze and Hardware Company, the discount from which will be, on and after July 1st, 25 per cent:

PRICE LIST OF BRONZE HARDWARE.

No. 1. 2 1/2 in. Hexagon Knobs, 3/4 Spindle. pair	\$5.00
2. 2 1/2 in. " " " " " " " "	4.00
3. 2 1/2 in. " " " " " " " "	3.50
4. 2 1/2 in. " " " " " " " "	3.00
5. 2 1/2 in. " " " " " " " "	2.50
6. 2 1/2 in. " " " " " " " "	2.00
7. 2 1/2 in. " " " " " " " "	1.50
8. 2 1/2 in. " " " " " " " "	1.00
9. 2 1/2 in. " " " " " " " "	75c
10. 2 1/2 in. " " " " " " " "	50c
11. 2 1/2 in. " " " " " " " "	25c
12. 2 1/2 in. " " " " " " " "	10c
13. 2 1/2 in. " " " " " " " "	5c
14. 2 1/2 in. " " " " " " " "	2 1/2 in. " " " " " " " "
15. 2 1/2 in. " " " " " " " "	2 1/2 in. " " " " " " " "
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James E. Halsey is also agent for the Industry Mfg. Co., manufacturers of Railway, Blacksmiths' and Miners' Tools; Hartzell, Potter & Co., manufacturers of Axe, Pick, Sledge, Maul and Hatchet Handles, Rims, Spokes, &c.; and Gooch's I X L Ice Cream Freezers. We publish herewith the Taylor Mfg. Co.'s price list for Swiss Hand Bells, the discount from which is 10 per cent. An illustration showing the full size of their smallest Bell will be found in an advertisement on 20th page.

PRICE LIST SWISS HAND BELLS.—PURE SWISS METAL.

Polished.	Silver Plated.	Nickel Plated.
No. Per Doz.	No. Per Doz.	No. Per Doz.
71.....	72.....	82.....
73.....	74.....	83.....
75.....	76.....	84.....
77.....	78.....	85.....
79.....	80.....	86.....
81.....	82.....	87.....
83.....	84.....	88.....
85.....	86.....	89.....
87.....	88.....	90.....
89.....	90.....	91.....
91.....	92.....	93.....
93.....	94.....	95.....
95.....	96.....	97.....
97.....	98.....	99.....
99.....	100.....	101.....

On the 9th instant the manufacturers of Copper reduced the price of Braziers, Copper, Circles, Segment and Pattern Sheets, Locomotive Fire Box Sheets, Sheathing and Bolt Copper 5 cents per pound. O'Neill's Patent Plashed Copper was also reduced 5 cents per pound; for revised list see price current.

The Waterbury Brass Company, 52 Beekman street, in a circular dated 7th inst., say: "On July 1st the price of Brass Kettles will be advanced to 50 cents per lb. This price, in all probability, will be maintained. Should you feel disposed to forward an order to us previous to July 1st, it will be filled at old prices."

German Silver Wire and Sheets have been advanced 5 cents per lb.

The market for all classes of foreign Hardware is dull, but prices are firm and unchanged. Alfred Field & Co. have issued a revised list for Coil and Trace Chains, etc., dated at Birmingham, May 27th, in which we notice a reduction in Coil Chain of 6d. per cwt., Breast Chains, polished twisted, 6d. per cwt., and Straight Link Traces 1/2d. to 3/4d. per pair. Prices here are well sustained at 9 cents, gold, for 3/4ths Coil Chain, and 6 1/2 @ 65 cents, gold, for 6 1/2-10-2 Traces. Peter Wright's Anvils are in fair supply at 12 1/2 @ 13 cents, gold, according to size.

There is a fair demand for Nails in small lots, and \$4 1/2 is the lowest rate that we have heard of for 100 keg lots; the market, however, is in a weak and demoralized condition, and although it is not easy to trace actual transactions at a lower figure than the net price named above, still there is no doubt whatever that orders of 500 kegs and over could be easily placed at better figures. Pittsburgh Nails have been offered in this market at \$4.50, net. We quote \$4.75 @ \$5, net, for 10d to 60d.

IRON.

American Pig.—The companies still ask \$48 for No. 1 at the furnaces, which is equal to \$50 delivered at Hoboken, but outside lots are pressing upon the market at \$47 @ \$48. No. 2 Extra Iron is in large stock and obtainable at a trifle lower, some parties claiming that certain brands can be had as low as \$42.50 per ton, though the general quotation is \$44 @ \$46. Forge Iron is also pretty plenty, and nominally quoted from \$36 @ \$40 per ton. There is very little inquiry for any description, and transactions are limited to small lots No. 1 from second hands, when obtainable cheap. In this way we hear of sales of 300 tons No. 1 Lehigh brands, at \$47 @ \$48; 50 tons No. 1 Crane, at \$47; 100 tons No. 1 Hudson, at \$48; 100 tons No. 1 Crane, and 100 tons No. 1 Saucen, on private terms.

Scotch Pig.—The arrivals of Scotch Iron have been quite free of late, mostly on steamer account, and owners have shown considerable anxiety to realize, resulting in a further decline. A steamship company sold 630 tons Monkland and Eglington, about half and half, at \$45, flat, four months, with interest added, equal to about \$44 per ton, which must entail a serious loss on the importation, as in fact all the late sales from ships have done. The demand for consumption is extremely light, and the market remains without support, so that little improvement can be looked for. Sales, in addition to above, include 200 tons Eglington, resold of the above lot, supposed to have been at \$46; 250 tons Glengarnock, on private terms; 50 tons Eglington, at \$46, cash; and 200 tons Glengarnock, from ship, at \$46. We quote from ship: Glengarnock, \$46 @ \$47; and Eg

CINCINNATI.

Messrs. ADDY, HILL & Co., under date of June 9, write us as follows: "The market for iron is without quotable change in prices. There is a fair supply of all grades except the high numbers of Car Wheel brands, which are scarce."

HOT BLAST CHARGE COAL.	
Hanging Rock No. 1, 1/2 ton, \$54.00	—4 mos.
" " No. 2, 1/2 ton, 50.00	50.00 to 51.00—4 mos.
" " " " " " " "	41.00 to 43.00—4 mos.
Tennessee No. 1, 1/2 ton, 51.00	51.00 to 53.00—4 mos.
" " " " " " " "	41.00 to 43.00—4 mos.
Alabama No. 1, 1/2 ton, 54.00	—4 mos.
Missouri No. 1, 1/2 ton, 54.00	54.00 to 55.00—4 mos.
" " " " " " " "	51.00 to 53.00—4 mos.

HOT BLAST STONE COAL.	
Missouri No. 1, 1/2 ton, \$52.00	52.00 to 53.00—4 mos.
" " " " " " " "	42.00 to 43.00—4 mos.
Ohio No. 1, 1/2 ton, 52.00	52.00 to 53.00—4 mos.
" " " " " " " "	39.00 to 40.00—4 mos.

COLD BLAST CHARGE COAL.	
Hanging Rock Car Wheel 1/2 ton, \$60.00	60.00 to 65.00—4 mos.
Missouri " " " " " " " "	60.00 to 65.00—4 mos.
Kentucky " " " " " " " "	58.00 to 60.00—4 mos.
Tennessee " " " " " " " "	58.00 to 60.00—4 mos.
Georgia " " " " " " " "	60.00 to 65.00—4 mos.
Alabama " " " " " " " "	60.00 to 65.00—4 mos.
Machinery and Forge, 58.00	60.00 to 65.00—4 mos.
Bloom, 119.00	115.00 to 120.00—4 mos.

LOUISVILLE.

Mr. Geo. H. Hall, under date of June 9, writes us as follows: "Market dull and weak, the demand being confined to lots for immediate use. The usual time, four months, is allowed on quotations below."

HOT BLAST CHARGE COAL.	
No. 1, 1/2 dry, from Hanging Rock Ores, \$54.00	55.00 to 56.00
" " " " " " " "	50.00 to 51.00
" " " " " " " "	48.00 to 49.00
" " " " " " " "	52.00 to 53.00
" " " " " " " "	48.00 to 49.00
" " " " " " " "	41.00 to 43.00
" " " " " " " "	54.00 to 55.00
" " " " " " " "	54.00 to 55.00

HOT BLAST STONE COAL.	
No. 1, 1/2 dry, from Missouri Ores, 50.00	50.00 to 52.00
" " " " " " " "	45.00 to 47.00
" " " " " " " "	40.00 to 41.00

COLD BLAST CHARGE COAL.	
Car Wheel from Hanging Rock Ores, 60.00	60.00 to 65.00
" " " " " " " "	56.00 to 58.00
" " " " " " " "	60.00 to 62.00
" " " " " " " "	60.00 to 62.00
" " " " " " " "	60.00 to 62.00
" " " " " " " "	60.00 to 62.00

BALTIMORE.

Messrs. WYTH & BROTHER, Iron and Steel merchants, corner of South Charles and Lombard streets, report us the following prices, under date of June 10, 1873: "There is no quotable change to note in this market for the past week. Trade is quiet, and unsatisfactory, with a continued softening in prices, all incident to the present condition of matters."

AMERICAN REFINED BAR IRON.	
1 to 6 wide by 1/2 to 1 thick, 1/4 to 1/2 c. per lb.	1/4 to 1/2 c. per lb.
Round and square, ordinary sizes, from 1/2 to 1 inclusive, 1/4 to 1/2 c. per lb.	1/4 to 1/2 c. per lb.
Hoop Iron, 1 1/2 wide and upward, 5/16 to 3/4 c. per lb.	5/16 to 3/4 c. per lb.
Band Iron, from 1 1/2 to 4 wide, 5/16 to 3/4 c. per lb.	5/16 to 3/4 c. per lb.
Horse Shoe Iron, 1 to 4 wide by 1/2 to 5/16 thick, 1/4 to 1/2 c. per lb.	1/4 to 1/2 c. per lb.
Black Diamond Cast Steel, Plates, Squares and Octagons, ordinary sizes, 17c.	17c.
Machinery Steel, 15c.	15c.
Cast Spring Steel, 11c.	11c.
Homogeneous Steel Plate, 13c.	13c.
Perkins' Horse Shoes, per keg of 100 lbs., \$6.37 1/2	\$6.37 1/2
Common Horse Nails, from 1 1/2 to 1 3/4 c. per 100	1 1/2 to 1 3/4 c. per 100
Putnam Horse Nails, 23 to 24 3/4 c. per 100	23 to 24 3/4 c. per 100
R. M. Spikes, 5 1/2 by 9-16 at 5 1/2 c. per lb.	5 1/2 by 9-16 at 5 1/2 c. per lb.

CHICAGO.

JUNE 5.—Hardware.—Is quiet at about previous prices. Owing to the dullness of the trade there is an occasional small advance. Iron, Steel and Nail—Market for Merchant Bar Iron during the past week has been very dull and prices have had a downward tendency. Cut Nails are lower and selling at 85 rates. Pig Iron—Dull and weak, and foreign qualities somewhat lower. Tin Plate—There has been a good demand during the past week for Tin Plate, and prices are easy. Lake Copper is lower at 33c. to 34c., owing to better supplies. Pig Lead is quotable at 8 1/2 c. Russia Iron, perfect, lower at 22c. —*Journal of Com.*

SAN FRANCISCO.

JUNE 3.—Hardware.—Business is improving. We quote Amesquey Axes, unhandied, \$14 to \$15; do. handied, \$18.50 to \$19.50; do. Pucet Sound Axes, unhandied, \$14.50; Hatchets—Amesquey, Shilling's No. 1, \$3.25; No. 2, \$3; No. 3, \$2.75; do. Claw, No. 1, \$2.75; No. 2, \$2.50; No. 3, \$2.25; Collins' Handled Axes at \$17.50 to \$20, according to weight. Metals.—The demand for Pig Iron is very light. Small sales continue to be made in lots at \$25.50 for Scotch, best brands held together. Foundrymen are carrying heavy stocks bought a year ago to arrive. Nails.—Imports from January last to May 16th: kegs, 41,229. The last notable sales were of Oxford Company, to arrive, upon terms withheld. This purchase falling to have cost about 2500 kegs. Otherwise than this, no round sales of invoice lots have been made this year, the reports in the daily press to the contrary notwithstanding. We quote invoice parcels of pig iron, \$25.50; do. trade prices remain, as heretofore, \$25.50 to \$26.50; do. 8d. and 10c. per keg above 10d.; 6d. and 7d., 50c. do. 10d.; 4d. and 5d., 75c. do. 10d.; 3d., \$1.50 do. 10d.; 2d. and 3d., 11c. \$2.25 do. 10d.; Cut Spikes, all sizes, 25c. above 10d. Thus the jobbers' range is \$5.75 to \$8.75.—*Com. Herald.*

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow and Manchester, under date of May 14, 1873, report: "Metals.—The aspect of this market has not improved during the week, and the complications in the iron trade which are likely to result from the action of the miners in the Cleveland district, and the furnace men in South Staffordshire have added additional gloom to the outlook for the future of this notable branch of it. There has been a steady demand for Scotch Pig Iron, and with the short output which will soon be the consequence of the dispute at Middlesbrough, we may look forward to a continuance of this activity. The shipments for the past week amount to 17,493 tons, against 23,560 tons in the same period of last year; but the home demand has more than compensated for this falling off and another inward has been made into the now very limited stock in Messrs. Connal's stores. In Middlesbrough the determination of the mine owners to close their mines rather than submit to the dictation of their men has already had the effect of damping down some of the furnaces, and if an arrangement is not shortly come to a most serious apprehension of this important portion of our national industry will be the consequence of this unfortunate dispute. There is no improvement in the demand for Copper, and very few sales are reported. Tin is quiet and quotations remain unchanged. With a present fair inquiry for Lead, and every prospect of its improving, smelters are very firm, and require full rates for their production. In Spelter a moderate business is being done, and prices are steady. Iron.—Ayrshire, Yorkshire Pig Iron, No. 1, 129/6; No. 2, 124/6; No. 3, 122/6; No. 4 (Foundry), 121/6; No. 4 (Forge), 121/6; net cash, or 2/ extra 4 months' bills. Scotch Pig Warrants, 116/ to 117/; Staffordshire Bars, 214/6 to 216/; hoop iron, 212/6 to 216/; Gas Tube, 30 per cent. off new flat. Boiler Tubes, 10 per cent. premium. English Tough Ingot, 296 to 298. Chilled Bars, 295 to 296. Tin—English Ingot, 2140. Straths, 2135 to 2136. TIN PLATES.—Best Coke, I. C. 34, to 39; Charcoal, I. C. 42, to 44 per box. LEAD.—Best English Soft Pig, 233, 15 to 234. Refined Red Lead, 235 to 237. ANTIMONY.—French Star, 238. SPelter.—Silesian, special brands, 227, 10 to 228. English, best brands, 227, 10 to 228.

GERMANY.

(Frankfurt Zeitung.) DORTMUND, May 24, 1873.—Iron unchanged, with a firm feeling prevailing. Coal continues in good demand, especially coke and block coal.

HAMBURG, May 23, 1873.—Metals.—Lead is firmly held at the following quotations: German, 24 1/2 to 25 1/2 marks; English, 25 to 26; and Spanish, 26 1/2. Copper is quiet, the demand being light; Northern sorts, 97 to 104. There is but a faint inquiry, and prices have turned rather in favor of purchasers; Banca, 165; English, 160; and red, 162 1/2. Spelter is firm, without dealings.

(Exchange Intelligence.) BERLIN, May 24, 1873.—Iron.—There has been no improvement during the week, and a decline all round has taken place, the sales being of a trifling nature. The following prices have been made: Good and best brands Scotch Pig, 78 to 81 silver marks; English, 70 to 74, the 50 kilos. Rails, for rolling purposes, 3 to 3 1/2 thalers; Rolling Iron, quiet, 5 1/2 to 5 3/4; Boiler Plates, 7 1/2 to 7 3/4; Thin Plates, 8 1/2 to 8 3/4, the 50 kilos, in large lots, 7 1/2 to 7 3/4, per ton, good sort. English and Chili, 3 1/2 to 3 3/4, the 50 kilos, and dearer in some cases. Tin, lower: Banca, 47 to 47 1/2; prime Lamb, 47 to 47 1/2, and in some instances better. Spelter, unaltered; W. H. Gieseler's Heils, in large parcels, 9 1/2 to 9 3/4; inferior Silesian brands, 9 1/2 to 9 3/4. Lead is firm; Tarnowitz, Harts and Saxony, 8 1/2 to 8 3/4, and in some cases more. Coal quiet.

FRANCE.

(Le Commerce.) PARIS, May 29, 1873.—The political crisis which France is traversing at present has added another element of paralysis to the many which already weigh down metals. Purchasers that were kept aloof from the market on account of exorbitant prices, now abstain from doing anything from political apprehensions, and seem to have resolved to do nothing except in cases of real bargains that may turn up. Such being the case, producers of Pig Iron have undertaken no further lowering of price lists, which would be useless under the circumstances. Coal keeps at such high prices that there is a limit, besides to putting down the price of a low lot, and we cannot, in any event, expect much of a decline from present reasonable rates. New machine shops are being erected in many localities throughout France, going to show that there is at the bottom no discouragement in the metal trade, notwithstanding the critical state of affairs in which the country is placed by an ever changing political aspect.

CHINA.

(Amoy News.) HONG KONG, April 25, 1873.—Metals.—No chance to note in the position of Nail Rods; holders continue firm, but there is scarcely any demand, and quotations are almost nominal. English Bar Iron continues to improve; where business is done, it is for the round and square sizes have found most favor. Soft Bars being in moderate stock are firmly held, but no sales are reported. A slight inquiry prevails for Hoops, but it has resulted in nothing hitherto, owing to the low rate of tenders. In Iron Wire and Steel a fair business has been done at former values. Lead has again been in more favor within the last few days, and prices have advanced fully 30c. per picul for L. B. which engaged the attention of speculators. Common brands and W. B. have not received much notice, but holders demand higher rates. Tin Plates are firmly maintained in value. Tin, improving. Quicksilver has become dull of sale, and prices, if anything, are easier. Yellow Metal quiet, but unchanged.

JAPAN.

(Charles Taylor & Co.) YOKOHAMA, May 18, 1873.—Latest telegraphic dispatches are dated London, 5th inst. The iron improvement in the market for imports generally, since the date of our last report, and Metals remain unchanged. We quote: Iron, flat and round, \$4 1/2 to \$5 per picul; Nail Rod, \$4 1/2 to \$5 per picul; \$12. Deliveries for local consumption, 350 piculs for re-export, 235, leaving stock 64 1/2 piculs. Nail Rod Iron only saleable. Stock of Iron Wire, 425 piculs. Steel nominal at \$5 1/2 to \$6 per picul.

BELGIUM.

(La Cote Libre.) BRUSSELS, May 28, 1873.—Iron has been slightly looking up during the week from the extreme depression we have, at least, in some departments. But orders are as yet on too restricted a scale to produce a decided reaction throughout the trade, and in the meantime a considerable augmentation of stocks is unavoidable, an impediment to recovery of the kind that would replace values near their former standpoint. The range of Pig Iron at Charleroi is between 145 and 160 francs per ton; Beams, 320 to 330; Rails, 310 to 320; Sheet, 400 to 410; at Liege, Pig, 155; Spiegel, 220 to 240; forges at the latter place, buying from hand to month only, in hopes of a decline. Wrought Iron at Liege completely neglected, so much so that manufacturers make no further reduction, and iron dealers, and leave them at 330 francs per ton No. 1, as a basis. Sheet, No. 2 and No. 3, better supported at 420 and 410 francs.

HOLLAND.

(Diederichsen Brothers.) AMSTERDAM, May 27, 1873.—Tin.—Since our last, Banca has again slightly declined, but the lower ruling at length attracted purchasers, resulting in business, 80 1/2 to 81 guilders. Yesterday's market has changed hands at 80 to 80 1/2 guilders, auction conditions.

ROTTERDAM.

(Koch & Viersboon.) ROTTERDAM, May 27, 1873.—The metal remains unimpairedly stagnant, and sales have been confined to some parcels of Banca at 80 1/2, and finally at 81 guilders. Bronze, 45 to 47 1/2 the 50 kilos.

SINGAPORE.

(Giffiths, Wood & Co.) SINGAPORE, June 5, 1873.—Telegraphic.—Malacca Tin, \$34 1/4 per picul.

CALCUTTA.

(Brotherton & Co.) CALCUTTA, May 27, 1873.—Per Telegraph.—English Hard Copper, 36 1/4; real Silesian Spelter, 10 1/2; good hard quality, 7 1/2; Yellow Metal, 32 1/2.

BOMBAY.

(Purnam & Co.) BOMBAY, May 1, 1873.—Metals have been steady; Copper, per cwt., 37s. 6d.; Brass, 55 to 56 rupees; Yellow Metal, per cwt., 45s. 6d.; Ingots, 47 to 53; Silesian, 44 1/2 to 45. Goods held firm at a slight advance, normally, but holders will not part with their stock at quotations, which are, West Hartley, 25 to 27 rupees per ton; Welsh Hartley, 26; Cardiff, 26, and Scotch, 24. Exchange closes weak, 6 months, London, 1/11 1/2 to 1/11 1/4 rupees.

BATAVIA.

(Rupener & Co.) BATAVIA, Java, April 16, 1873.—Metals.—Iron is unchanged. English Copper Sheet has been sold at 86 to 87 1/2, assorted. Tin.—The sale of 9023 piculs Billiton, held on the 7th inst., averaged 92 1/2 rupees per picul. The next sale of 9000 piculs will be held on Tuesday, June 3. Coal still without arrivals. A cargo of Welsh Hartley, ahead, is offered for sale. Exchange, 6 months, London, 11 1/2 to 11 1/4 guilder, 2/ sterling.

POINT DE GAULE.

(Clyton & Co.) POINT DE GAULE (Ceylon), April 30, 1873.—Plumbago.—There are no signs of diminution of the late animated demand for the United States. Notwithstanding some fictitious maneuvering to create a fall, really good quality material is held at high value, and with the approach of the Southwest monsoon, which will curtail operations considerably for the next three to four months, there is no probability of a decline. Inferior qualities, we have repeatedly stated, are neglected, and the class are that they will continue so. Exports from Oct. 1, 1872, to April 22, 1873, amount to 4073 tons, of which 2655 to the United States. Total exports from Ceylon during the last period, 1872 to 1873, 3600 tons. We quote: Lump, with select qualities in request, 27 1/2 to 28 1/2; 10 to 10 1/2 per ton; Chips, 21 1/2 to 22 1/2; 10 to 10 1/2; and 2 1/2 to 2 1/2 per ton, free on board, with freight at 2 1/2 to 2 1/2 per ton, up to the market is still in an excited state, caused by the difficulty of procuring outward tonnage, even at high rates, and the protracted high value of the mineral at home. The Kilmijoe Oodewee brought a cargo of 1300 tons South Wales for sale, which realized 22 1/2 c. sh.; similar cargoes would fetch even 55, so great is the demand for Cardiff coals. Steamers would have to pay 62 1/2, free on board, for such coal, immediately landed. Freight on stocks are being disposed of at 55, Newcastle, and 60, Cardiff. Exchange rather better at 1/11 1/2 to 1/11 1/4, 6 months, London.

Cane Presentation.

On Saturday last, Mr. J. B. Sargent, of the well-known firm of Sargent & Co., was presented by the employees of their factory at New Haven, with a handsome gold headed cane, and a series of resolutions expressing personal respect and esteem, and good wishes for his safety during the European tour on which Mr. S. is about to start.

Mr. Sargent, who was completely taken by surprise, made a brief but suitable and feeling reply.

On Saturday last the employees of the Russell & Erwin Mfg. Co. and Sargent & Co. engaged in a game of base ball. Mr. Tingley, of the H. L. Judd Mfg. Co., acted as umpire, to the entire satisfaction of all concerned. The game, which occupied two hours and a half, was closely contested, as will be seen by the following score:

RUSSELL & ERWIN.		SARGENT & CO.	
O. R.	O. R.	O. R.	O. R.
Lynch, c.	3	Breese, 1st b.	3
McCarthy, 1st b.	3	McCarthy, 2nd b.	3
Geer, 1st b.	3	Howell, 2nd b.	3
Filly, 2nd b.	3	Russell, 1st b.	3
Munn, 3rd b.	3	Felix, c.	3
Weeks, 1st b.	3	Trumbull, c.	3
McGills, 1st b.	3	Trumbull, c.	3
McCarthy, c.	3	Pearson, c.	3
Beach, r.	3	Johnson, 2nd b.	3
Total	37	Total	37
Innings	1 2 3 4 5 6	Innings	1 2 3 4 5 6
Russell & Erwin	3 4 1 0 3 1	Russell & Erwin	3 4 1 0 3 1
Sargent & Co.	3 2 0 0 3 1	Sargent & Co.	3 2 0 0 3 1

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending June 10, 1873:

Hardware.		Smith G. G. & Co.	
Althoff, Bergmann & Co.	Cases, 2	Bars, 2099	
Austin, Baldwin & Co.	Packages, 2	Hoop, bbls., 981	
Bryce Wm. & Co.	Packages, 2	Whitney A. R.	
Arms, cases, 15		Half oval, bbls., 41	
Beam & Murray.	Mdse, pkgs., 5	Pig, tons, 935	
Mdse, pkgs., 5		Scroll, bbls., 60	
Baker Hermann & Co.	Mdse, pkgs., 21	Shells, 453	
Chains, cks., 32		Bundles, 629	
Bassford E. D.	Cases, 5	Old rails, pcs., 1220	
Campbell H. P.	Packages, 7	Bar, 610; bbls., 240	
Packages, 7		Shells, bbls., 255	
Curry J. & Bro.	Cases, 53	Rods, bbls., 166	
Degraw, Aymer & Co.	Plates, 279		
Chains, 30; cks., 5			
Dickinson Henry	Cases, 3		
Cases, 3			
Fisher Jas. S.	Cases, 33		
Cases, 3			
Frith Edward.	Bundles, 9		
Cases, 1			
Field A. C.	Bundles, 326		
Mdse, pkgs., 10			
Packages, 41			
Green John.	Cases, 22		
Cases, 2			
Green Hannibal.	Cases, 46		
Anvil, 46			
Hugill Chas.	Cases, 6		
Hillier E. & Sons.	Packages, 141		
Hopkins E. F.	Blooms, 90		
Cases, 2			
Hildes A. H.	Cases, 13		
Chains, 6			
Mdse, pkgs., 5			
Johnson W. H. & Co.	Bundles, 225		
Wire, bbls., 67			
Keppelmann A.	Cases, 24		
Cases, 19			
Kart W.	Axles, 185		
Arms, cases, 1			
Lau & Garlick.	Mdse, pkgs., 40		
Arms, cases, 41			
Lang W. Bailey & Co.	Mdse, pkgs., 47		
Cases, 1			
Miller N. & Co.	Cases, 16		
Cases, 1			
Moss F. W.	Bundles, 25		
Flies, cks., 18			
Merchants Dispatch Co.	Mdse, pkgs., 188		
Packages, 12			
Mulford, Cary & Conklin.	Sanderson Geo. & Co.		
Owen A.	Cases, 31		
Packages, 2			
Pago E. & Co.	Cases, 21		
Five rods, coils, 1329			
Peace Cycles, 5			
Remington E. & Son.	Voss, Dinsmore & Co.		
Guns, cks., 1	Mdse, pkgs., 622		
Russell & Erwin Mfg.	Van Wart & McCoy.		
Flies, cks., 3	Bundles, 1057		
Schoverling & Daly.	Wardlaw W. C.		
Mdse, pkgs., 1	Cases, 40		
Spies, Krock & Co.	Bundles, 10		
Packages, 2			
Sawyer John.	Scrap, tons, 30		
Wire rope, coils, 2	Rails, 1904		
Tomes Melvin & Co.	Spring, tons, 31		
	Bundles, 691		
	Rods, 15		
	Pieces, 38		
	Cases, 18		

Metals.

Arkell, Tafts & Co.		Bertschmann J. & Co.	
Packages, 561		Tin plates, bxs., 1445	
Tin plates, bxs., 1445		Bar, bbls., 15	
Bar, bbls., 15		Bruce & Cook.	
Bruce & Cook.		Tin plates, bxs., 1490	
Tin plates, bxs., 1490		Corr. N. L. & Co.	
Corr. N. L. & Co.		Tin and tern plates, bxs., 247	
Tin and tern plates, bxs., 247		Tin plates, bxs., 190	
Tin plates, bxs., 190		Dickerson J. S. & Co.	
Dickerson J. S. & Co.		Tin plates, bxs., 1103	

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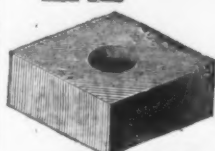
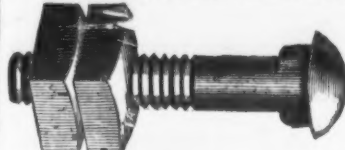
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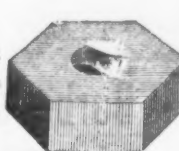
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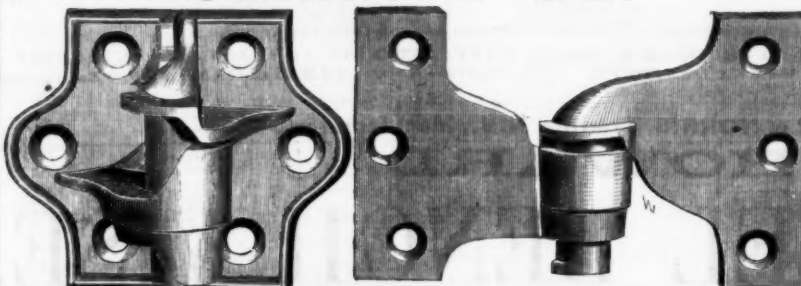
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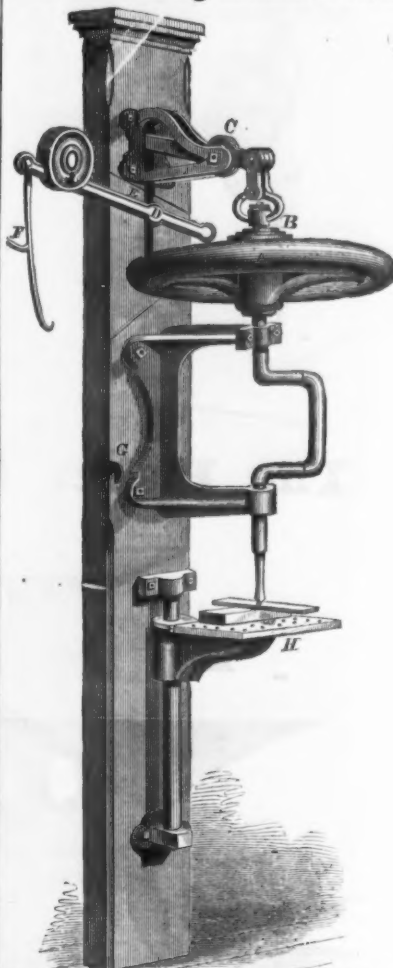
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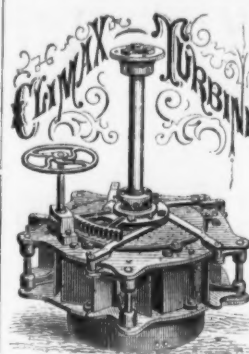
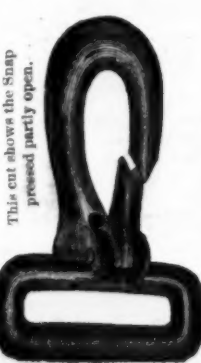
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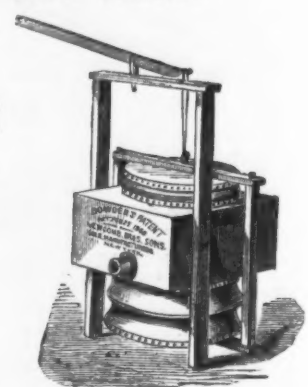
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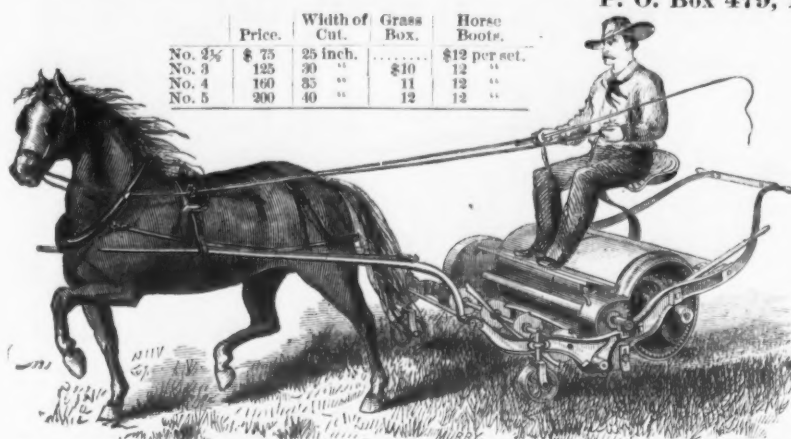
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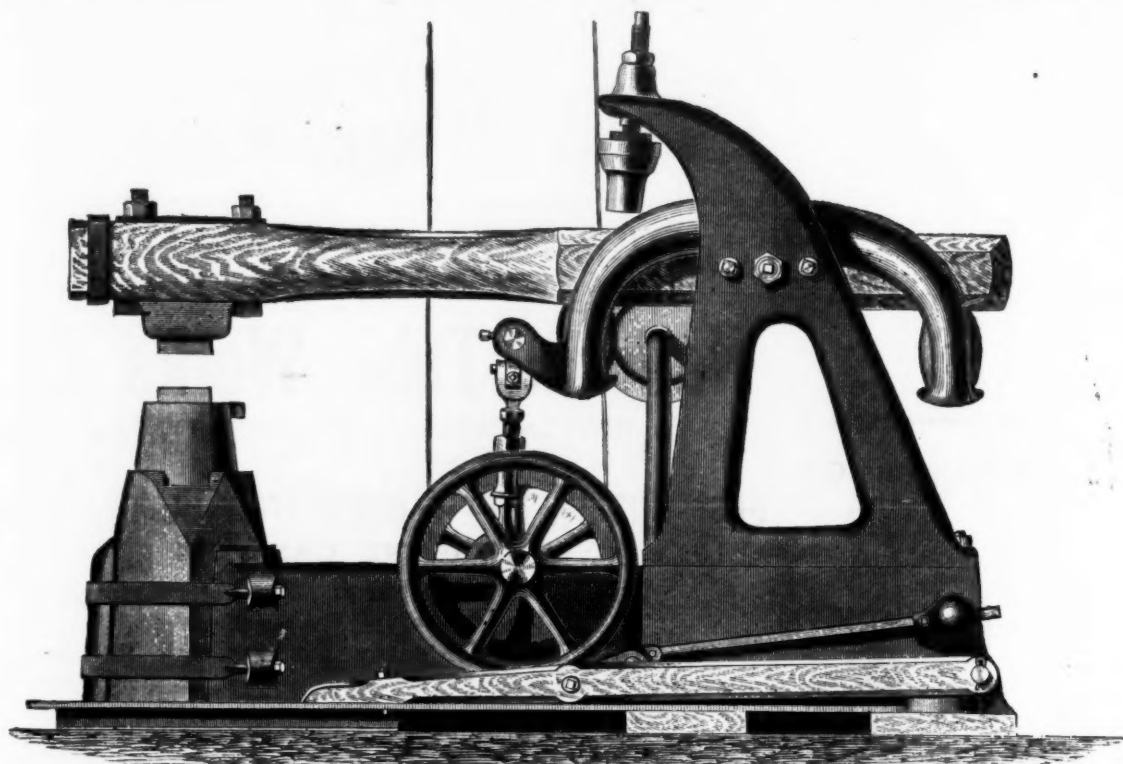
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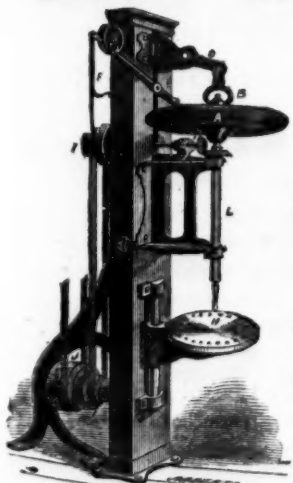
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Lull & Porter's.....	per doz \$10 @ 15
Palmer's.....	per doz \$10 @ 15
No. 1 for wood.....	per doz \$10 @ 15
No. 2 for brick.....	per doz \$10 @ 15
Garrettson's.....	per doz \$10 @ 15
Extra discount on Blind Butts by the case, 5 per cent.	

CHAINS.—German Hatter.

Galvanized Pump.....	per doz \$10 @ 15
English Coil, less than cast.....	per doz \$10 @ 15
Common Chain.....	per doz \$10 @ 15
Best Proof Coil Chain.....	per doz \$10 @ 15
By the case, 500 lbs., discount 5 per cent.	
Chain, 5/8 in. less than proof.....	per doz \$10 @ 15

CHISELS.—Socket Framing.

Socket Framing.....	per doz \$10 @ 15
Tang.....	per doz \$10 @ 15
Beatty's Framing and Firmer.....	per doz \$10 @ 15
CANSTERS —Porcelain Wheel.....	per doz \$10 @ 15
Iron.....	per doz \$10 @ 15
Brass.....	per doz \$10 @ 15

CLOTHES WRINGERS.—Universal.

Novelty.....	per doz \$10 @ 15
Providence.....	per doz \$10 @ 15
In lots of 2 dozen, discount 25 per cent.	
King Wringers (Iron Frame).....	per doz \$10 @ 15

COFFEE MILLS.—Common Box and Side.

Patent Box and Side.....	per doz \$10 @ 15
Canterbury.....	per doz \$10 @ 15
Landers, Fray & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.	
DRAWING KNIVES —H. Mfg. Co.'s.....	per doz \$10 @ 15
Concrete Adjustable Handle.....	per doz \$10 @ 15
Beatty's.....	per doz \$10 @ 15

FILES.—Nicholson Mill Files.

Nicholson Bastard.....	per doz \$10 @ 15
Taper.....	per doz \$10 @ 15
Butcher's Mill.....	per doz \$10 @ 15
Bastard.....	per doz \$10 @ 15
Taper.....	per doz \$10 @ 15
Moss & Gamble—Mill, Taper and Bastard.....	per doz \$10 @ 15

FLUTING MACHINES.

Royal, No. 1, 1/2 in. Rollers.....	per doz \$10 @ 15
No. 2.....	per doz \$10 @ 15
HAMMERS AND HATCHETS	per doz \$10 @ 15
Verkes & Plumb's.....	per doz \$10 @ 15
Hammond & Son's.....	per doz \$10 @ 15

HINGES.—Strap and T.

Bonney's No. 1 Gate.....	per doz \$10 @ 15
No. 2 and 3.....	per doz \$10 @ 15
HORSE NAILS	per doz \$10 @ 15
Assable.....	per doz \$10 @ 15
Globe.....	per doz \$10 @ 15
Brundage.....	per doz \$10 @ 15
Purnam.....	per doz \$10 @ 15
On Assable, Globe and Brundage 1000 h lots.....	per doz \$10 @ 15

KNIVES.—Door (regular manufacture).

Knives.....	per doz \$10 @ 15
Porcelain and Mineral.....	per doz \$10 @ 15
LOCKS AND LATCHES —Rim and Mortise.....	per doz \$10 @ 15
Till and Cupboard.....	per doz \$10 @ 15
American Padlocks.....	per doz \$10 @ 15
Frank Locks.....	per doz \$10 @ 15
Thumb and Rogers Latches.....	per doz \$10 @ 15

MATTOKES.—Long and Short Cutter.

Western Pattern.....	per doz \$10 @ 15
Pennsylvania Pattern.....	per doz \$10 @ 15
MOLASSES GATES	per doz \$10 @ 15
Enterprise Mfg. Co.'s Measuring Fanets.....	per doz \$10 @ 15
Stebbins' Gates.....	per doz \$10 @ 15
Lincoln's.....	per doz \$10 @ 15
Landers, Fray & Clark's Petroleum.....	per doz \$10 @ 15
Taylor's Petroleum Fanets.....	per doz \$10 @ 15

RAKES.—Cast Steel Garden.

Malleable Garden.....	per doz \$10 @ 15
Wood Head Iron Teeth.....	per doz \$10 @ 15
RULES —Stanley Rule and Level Co.....	per doz \$10 @ 15
Stevens' and Hubbard's.....	per doz \$10 @ 15
SQUARES —Steel and Iron, new list.....	per doz \$10 @ 15
S.W.—Denton's Cross Cut.....	per doz \$10 @ 15
Denton's Hand.....	per doz \$10 @ 15
W. McNeely's H'd. Cross-Cut & O'let, new list.....	per doz \$10 @ 15
Boynton's Lightning, new list.....	per doz \$10 @ 15

SPEARS.—Rowland's Plain Back, list Feb. 1873.

Back Strap.....	per doz \$10 @ 15
Oliver Ames & Son's.....	per doz \$10 @ 15
Brady Shovel Co.....	per doz \$10 @ 15
STEEL IRONS —Reading (planed face).....	per doz \$10 @ 15
Couquaque (No. 1).....	per doz \$10 @ 15
STONE POLISH —Gem.....	per doz \$10 @ 15
Only.....	per doz \$10 @ 15
Scythes—Golden Clipper.....	per doz \$10 @ 15
Clipper No. 10.....	per doz \$10 @ 15
Common Scythes.....	per doz \$10 @ 15
SCREWS —Iron.....	per doz \$10 @ 15
Brass.....	per doz \$10 @ 15

SPOONS.—Plated Spoon, Rogers Bros.

Britannia, Parker's and Boardman's.....	per doz \$10 @ 15
German Silver.....	per doz \$10 @ 15
Light.....	per doz \$10 @ 15
TRY SQUARES —Denton's.....	per doz \$10 @ 15
Stanley Rule and Level Co.....	per doz \$10 @ 15
Willis Thall, No. 2.....	per doz \$10 @ 15
Willis Thall, No. 1.....	per doz \$10 @ 15

TACKS, ETC.—H. Mfg. Co.'s.

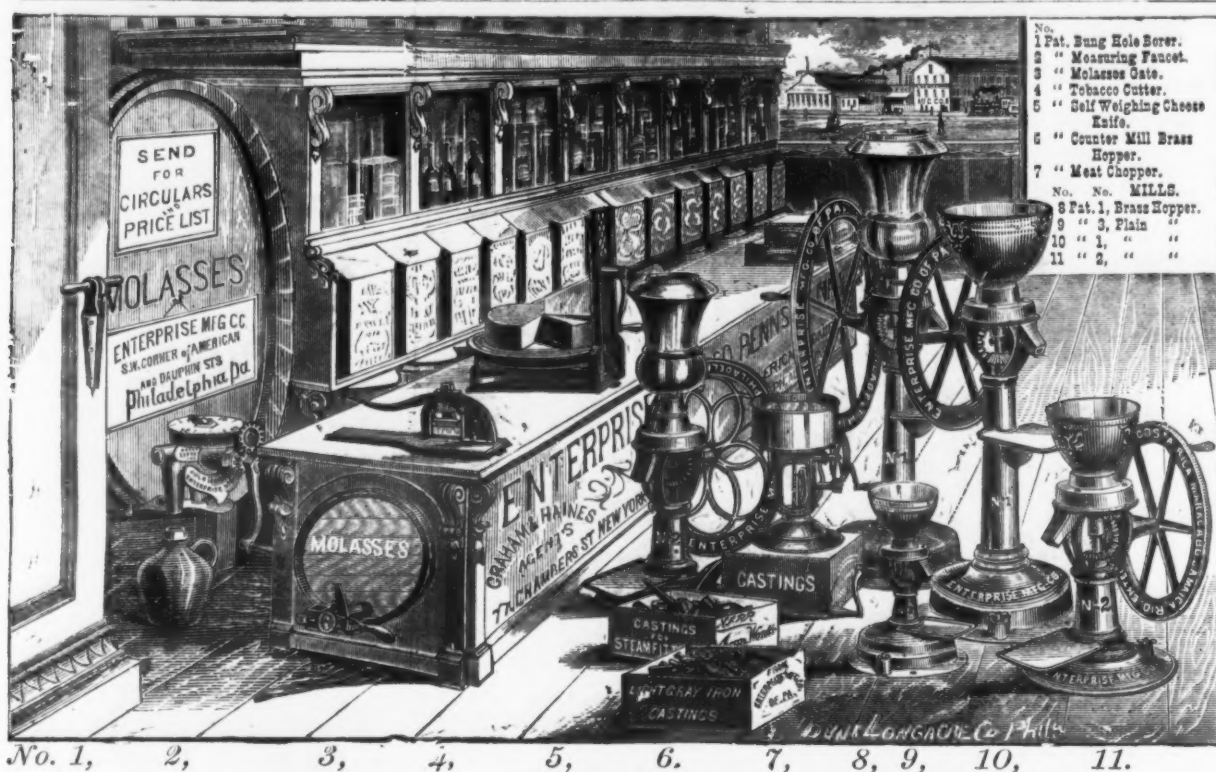
Clout and Finishing Nails.....	per doz \$10 @ 15
Traps—Genuine Onions—Newhouse list.....	per doz \$10 @ 15
Imitation.....	per doz \$10 @ 15
Wrenches—Coe's Genuine.....	per doz \$10 @ 15
Coe's Imitation Wrought Bar.....	per doz \$10 @ 15
Malleable Bar.....	per doz \$10 @ 15
Tafts Wrought Bar.....	per doz \$10 @ 15
Wire—No. 9 to 12.....	per doz \$10 @ 15
No. 13 to 20.....	per doz \$10 @ 15
No. 21 to 30.....	per doz \$10 @ 15
Coppered 0 to 1.....	per doz \$10 @ 15
Tinned Broom Wire.....	per doz \$10 @ 15

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
May 9, 1873.

AXES —Chopping—Blood's.....	per doz \$12 50 @ 14 00
Augers—C. S. Cut.....	per doz \$12 50 @ 14 00
Bits, Auger—Pierce's.....	per doz \$12 50 @ 14 00
Jennings'.....	per doz \$12 50 @ 14 00
Bells, Cow—Yan's Genuine.....	per doz \$12 50 @ 14 00
Bells, Hand.....	per doz \$12 50 @ 14 00
Bellows—Smith's.....	per doz \$12 50 @ 14 00
Moulders.....	per doz \$12 50 @ 14 00
Bolts—Carriage and Tire, Diamond Neck.....	per doz \$12 50 @ 14 00
Braces, Bit—Barber's.....	per doz \$12 50 @ 14 00
Spooford's Patent.....	per doz \$12 50 @ 14 00
Brads, Cut.....	per doz \$12 50 @ 14 00
Boards—Store, Brooks' Patent, new list.....	per doz \$12 50 @ 14 00
Butts—Brass.....	per doz \$12 50 @ 14 00
Cast Loose Joint.....	per doz \$12 50 @ 14 00
Wrought Narrow.....	per doz \$12 50 @ 14 00
Table and Back Flaps.....	per doz \$12 50 @ 14 00
Beating—Rubber.....	per doz \$12 50 @ 14 00
Leather, new list.....	per doz \$12 50 @ 14 00
Beaters, Egg, "Peelers".....	per doz \$12 50 @ 14 00
Brick—Bath (box of 2 doz) Best English.....	per doz \$12 50 @ 14 00
Rutherford.....	per doz \$12 50 @ 14 00
Bung Borers—Enterprise.....	per doz \$12 50 @ 14 00

Chalk—White, Carpenter's.....	per gross, 600
Red, Carpenter's.....	per gross, 600
Blue.....	per gross, 600
Green School.....	per gross, 600
Chisels—Firm Socket.....	per doz \$10 @ 15
Pruning Socket.....	per doz \$10 @ 15
Corner Socket Chisels.....	per doz \$10 @ 15
Slick's Carpenters.....	per doz \$10 @ 15
Castings—Malleable.....	per doz \$10 @ 15
Cutters—Head—Hale's Patent.....	per doz \$10 @ 15
Cherry Seeders.....	per doz \$10 @ 15
Elbows—Corrugate.....	per doz \$10 @ 15
Charcoal.....	\$4 25 5 25 5 25 6 50
Russia.....	12 50 13 00 13 00 14 00
Faucets—Wood, Cork Lined.....	dis 30x 10 5
Fires—Wheeler, Madden & Gleason's.....	dis 42x 5
Freezers, Ice Cream—Champion.....	dis 33x 5
Gates—Molasses.....	per doz \$10 @ 15
Patent Self-Measuring.....	per doz \$10 @ 15
Shepherd's Standard and Clark's.....	dis 30x
Garretson's Blind Hinges.....	dis 40x
Wrought Blind Hinges.....	dis 15x 5
Hods, Coal—Plain, Black and Galvanized.....	dis 13x 10 5
Funnel, Black and Galvanized.....	new list net
Fancy and Helmer.....	new list net
Hammers—Maydole's.....	per doz \$10 @ 15
Verkes & Plumb's.....	dis 3x 10 5
Hatchets—Blood's.....	per doz \$10 @ 15
Hooks and Staples—Wrought.....	net 6x 5
Hooks—Belt.....	dis 13x 10 5
Hose and Staples—Wrought.....	dis 50x 10 5
Planes, Bench.....	per doz \$10 @ 15
Sad Irons.....	per doz \$10 @ 15
Knives—Drawing—Oval No. 1.....	dis 37 5x 40 30
Cutlery Blade—Hale's Patent.....	dis 37 5x 40 30
Lanterns—Peelers.....	per doz \$10 @ 15
"Radiant".....	per doz \$10 @ 15
Machines—Apple Paring, Turn Table.....	per doz \$10 @ 15
Lighting.....	per doz \$10 @ 15
Timmen's.....	per doz \$10 @ 15
Mills, Coffee—Box and Slide, common.....	per doz \$10 @ 15
Box Union and Eagle.....	dis 10x 5
Swift's Patent.....	dis 10x 5
"Champion".....	dis 10x 5
Nails—Cut, Cheapest.....	\$4 88 nets
Clout and Finishing.....	dis 7 5x 5
Shoe.....	dis 7 5x 5
Horse, Amable.....	No. 3 6 2 8 9 10
"Clinton".....	No. 3 6 2 8 9 10
Packing—Rubber.....	28 21 23 29 18c
Pencils, Slate—Soapstone.....	dis 30 6 35 5
Case lots.....	30 40 60x 10 50
Paint—White Lead, U. S. Gov't.....	dis 20x 5
Rivets—Iron, Black and Tinned.....	dis 20x 5
Copper.....	dis 10x 5
Rope—Manila, 1/2 inch and larger.....	per doz \$10 @ 15
Rules—Boxwood and Iron, Stephens.....	dis 30x 10 5
Staples—Blind, Boardman's Pat., 1/2 & 3/4.....	per doz \$10 @ 15
Skates—White.....	per doz \$10 @ 15
Skates—Black and White.....	net 30x 5
Spoons, Iron Tinned.....	dis 10x 5
Plated Rogers' A No. 1.....	dis 13x 25x 10 5
Britannia.....	per doz \$10 @ 15
Squares—Steel and Iron.....	per doz \$10 @ 15
Shovels, Horse—H. Burden & Sons.....	per doz \$10 @ 15
Shovels & Spades—Shepard, Forsyth & Co.....	dis 15x 5
Saws—Henry Dutton & Sons.....	dis 15x 5
Scales—Buffalo Scale Works.....	dis 15x 5
Fairbanks.....	dis 15x 5
Shears—Seymour's.....	dis 15x 5
Tools—Timmen's.....	dis 15x 5
Trans, Steel—Newhouse.....	dis 17x 5
Tacks—Half Weight Am. Iron.....	dis 70x 7 5
Tees—Parallel, Buffalo.....	dis 30x 5
Wrenches—Coe's genuine.....	dis 30x 5
Coe's Imitation.....	dis 50x 10 5
Tafts' Pattern.....	dis 50x 10 5
Ware—French, Tinned and Iron.....	dis 20x 5
Stamped and Japanned.....	per doz \$10 @ 15
Cast Iron Hollow.....	per doz \$10 @ 15
Tin Plates—Add for each X.....	per doz \$10 @ 15
10x12, 14x12, 16x12, 18x12, 20x12, 22x12, 24x12, 26x12, 28x12, 30x12, 32x12, 34x12, 36x12, 38x12, 40x12, 42x12, 44x12, 46x12, 48x12, 50x12, 52x12, 54x12, 56x12, 58x12, 60x12, 62x12, 64x12, 66x12, 68x12, 70x12, 72x12, 74x12, 76x12, 78x12, 80x12, 82x12, 84x12, 86x12, 88x12, 90x12, 92x12, 94x12, 96x12, 98x12, 100x12.....	per doz \$10 @ 15
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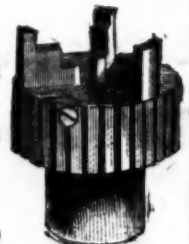
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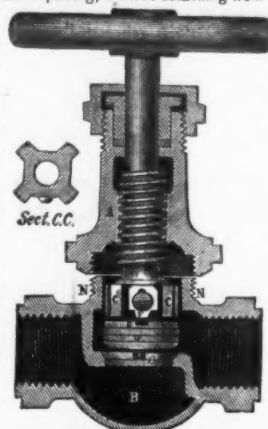
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Adapted for Re-grinding and repairing, without detaching from their position while in use.

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We venture to assert that this can-
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is the only Re-grinding Valve
whose valve stem is adapted to be
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an additional piece.
The Stuffing Box can be packed
with a full head of steam on the
Valve, whether it be closed or open
to its fullest extent. The Screw of



the Nut which connects it to the
Globe is so completely protected
by the steam tight joint at the top
of the neck, that no cement is re-
quired, and it can be unscrewed at
any time without difficulty.

TO RE-GRIND THE
VALVE

It will be seen that it is only neces-
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giving a half turn to the screw
which confines it—drop into the
Slot S of the valve, as seen in cut,
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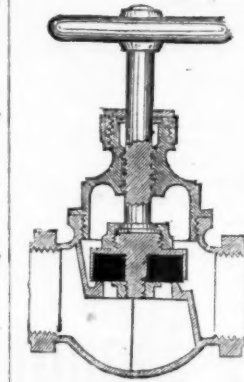
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Staples—White.....	gross, 60c
Straps, Skate—Hudson's.....	gross, 60c
Spoons, Iron Tinned.....	gross, 60c
Plated Rogers' A. No.....	gross, 60c
Britannia.....	gross, 60c
Squares—Steel and Iron.....	gross, 60c
Shoes, Horse—H. Burdon & Sons.....	gross, 60c
Shovels & Spades—Shepard, Forsyth & Dennison.....	gross, 60c
Saw—Henry Dixon & Sons.....	gross, 60c
Seals—Buckale Seal Works.....	gross, 60c
Fairbanks.....	gross, 60c
Shears—Seymour's.....	gross, 60c
Tools—Plumber's.....	gross, 60c
Traps, Steel—Newhouse.....	gross, 60c
Tacks—Half Weight Am. Iron.....	gross, 60c
Traps—Plumber's.....	gross, 60c
Wrenches—Coe's genuine.....	gross, 60c
Coe's Imitation.....	gross, 60c
Ware—French, Tinned and Iron.....	gross, 60c
Stamped and Japanned.....	gross, 60c
Cast Iron Hollow.....	gross, 60c
Tin Plates —Add for each X.....	
10x14, 10 C. Charcoal.....	14 25 @ 14 25
12x17.....	14 25 @ 14 25
14x20.....	14 25 @ 14 25
Pig Tin —Strait.....	42c @ 43
Banca.....	42c @ 43
Solder	
No. 1.....	20c @ 20c
No. 2.....	20c @ 20c
Sheet Zinc —"Lasalle".....	100 50 @ 100 50
11x15.....	11 50 @ 11 50
11x20.....	11 50 @ 11 50
Iron Wire —Bright and Annealed.....	
Coppered.....	25c @ 25c
Tinned.....	25c @ 25c
Tinned Broom.....	25c @ 25c
Copper —Sheathing 14 @ 18 oz.....	45c @ 45c
Planished.....	45c @ 45c
Bottoms.....	45c @ 45c
Boils.....	45c @ 45c
Braziers' Sheets.....	45c @ 45c
Sheet Iron —Smooth Finish.....	
No. 10 to 14.....	8 50 @ 8 50
No. 15 to 20.....	8 50 @ 8 50
No. 21 to 24.....	8 50 @ 8 50
No. 25 & 26.....	8 50 @ 8 50
Am. Russia.....	8 50 @ 8 50
Gen. Russia, No. 1 stained.....	15 50 @ 15 50
Galvanized.....	15 50 @ 15 50

BOSTON.

(Corrected by Fuller, Dana & Pitt.)

Tin Plates	10 00 @ 15 00
I. C. Charcoal.....	10 00 @ 15 00
Pig Tin	10 00 @ 15 00
Strait.....	10 00 @ 15 00
English.....	10 00 @ 15 00
Copper	
Sheathing.....	10 00 @ 15 00
Yellow.....	10 00 @ 15 00
Lead	
Spanish Pig, gold.....	10 00 @ 15 00
Slitsan, gold.....	10 00 @ 15 00
Zinc —Sheet.....	10 00 @ 15 00
Iron—Sheet Iron, Russia, gold.....	10 00 @ 15 00
Sheet Iron, English.....	10 00 @ 15 00
"American.....	10 00 @ 15 00
"Galvanized.....	10 00 @ 15 00
Swedes Bar Iron, Flat, gold.....	10 00 @ 15 00
Shoe Shapes, gold.....	10 00 @ 15 00
Norway Bar Iron, Flat, gold.....	10 00 @ 15 00
"Shapes, gold.....	10 00 @ 15 00
"Round, 2 in. to 4 in., gold.....	10 00 @ 15 00
"1 1/2 to 2 in., gold.....	10 00 @ 15 00
"Nail Rods, Rolled.....	10 00 @ 15 00
"Vasa.....	10 00 @ 15 00
"Benzon.....	10 00 @ 15 00
"W. B.....	10 00 @ 15 00
English Retined Bar Iron.....	10 00 @ 15 00
Scotch Pig Iron.....	10 00 @ 15 00
American.....	10 00 @ 15 00
Wrought Scrap Iron.....	10 00 @ 15 00
Steel	
Eng. Tool, gold.....	10 00 @ 15 00
"Mach.....	10 00 @ 15 00
American Tool.....	10 00 @ 15 00
"Mach.....	10 00 @ 15 00
Bessemer.....	10 00 @ 15 00

PITTSBURGH.

Flat Bar	
1 1/2 x 1/2 x 1/2 in.....	4 40 @ 4 40
1 1/2 x 1/2 x 1/2 in.....	4 40 @ 4 40
1 1/2 x 1/2 x 1/2 in.....	4 40 @ 4 40
Horse Shoes	
All sizes.....	5 00 @ 5 00
Heavy Bands	
1 1/2 x 1/2 x 1/2 in.....	4 40 @ 4 40
1 1/2 x 1/2 x 1/2 in.....	4 40 @ 4 40
Light Bands	
1 1/2 x 1/2 x 1/2 in.....	4 40 @ 4 40
1 1/2 x 1/2 x 1/2 in.....	4 40 @ 4 40
Round and Square	
1 to 1 1/2 in.....	4 40 @ 4 40
2 to 2 1/2 in.....	4 40 @ 4 40
3 to 3 1/2 in.....	4 40 @ 4 40
4 to 4 1/2 in.....	4 40 @ 4 40
5 to 5 1/2 in.....	4 40 @ 4 40
Oval Iron	
1 1/2 x 1/2 in.....	4 40 @ 4 40
2 to 2 1/2 in.....	4 40 @ 4 40
Half Oval and Half Round	
1 1/2 x 1/2 in.....	4 40 @ 4 40
2 to 2 1/2 in.....	4 40 @ 4 40
Sheet Iron	
15 to 20.....	8 50 @ 8

Steel.

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1st CLASS PRIZE MEDALS.
CLASSES 1, 21, 22.
Great Exhibition of Industry,
LONDON, 1851.

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SOCIETY OF ARTS & INDUSTRY,
LONDON, 1856.

1st CLASS
PRIZE MEDAL, CLASS 1st
UNIVERSAL
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PARIS, 1855.

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SAN FRANCISCO, Russell & Erwin Manufacturing Co.

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Successor to JOSHUA MOSS & GAMBLE BROTHERS,
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STEEL AND FILES.

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Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

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quality, temper, and adaptation in all respects to the various purposes
for which it may be required. Half a century of practical expe-
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reputation in England, and the Continent of Europe, and in the Eastern
States principally of this Country, encourage us to solicit a universal
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class material in quality, temper, and durability is needed.*

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AULTMAN STEEL CO.,

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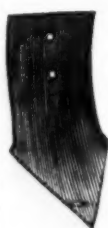
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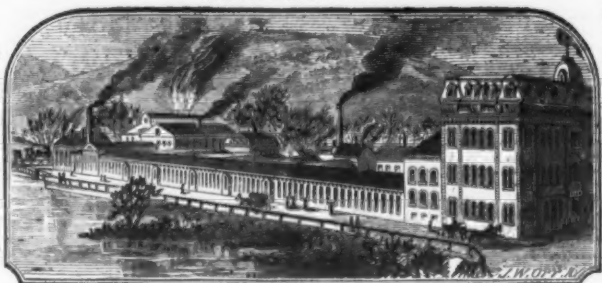
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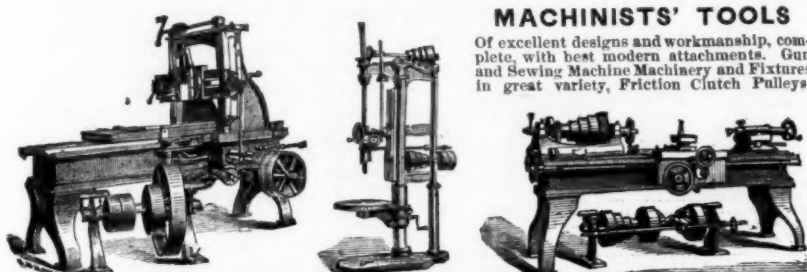
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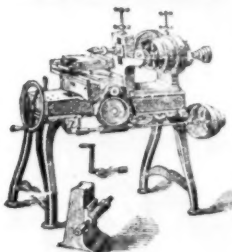
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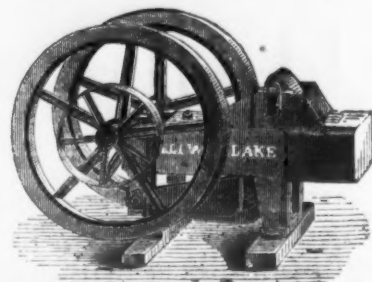
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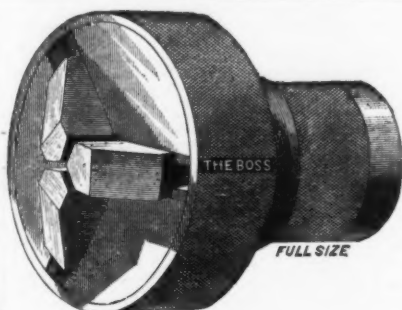
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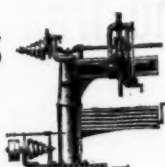
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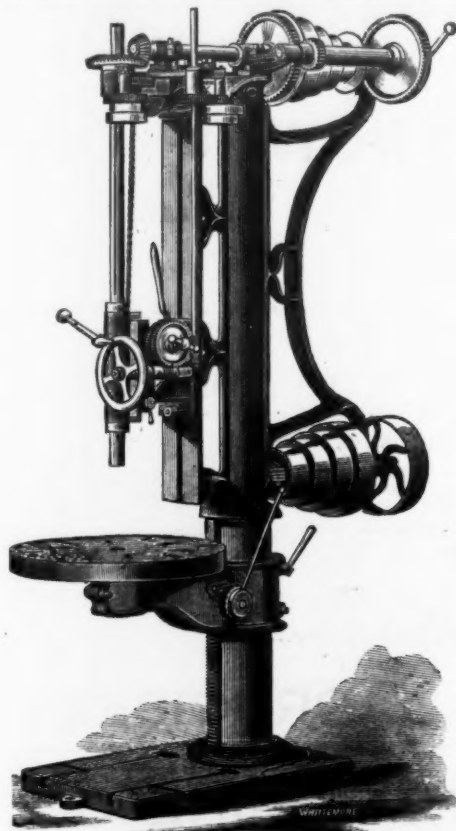
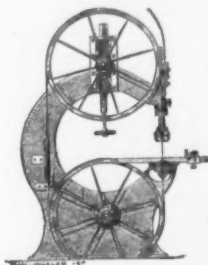
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BAND SAW MACHINERYFor Ship & Car Builders, Agricultural, Wagon,
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JACKS for Pressing on Car Wheels or CRANK PINS made to order.

The Bessemer Steel Works,
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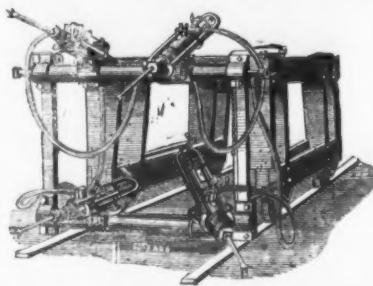
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We are melting 225,000 lbs. (112½ tons.)
Pig Iron daily. (20 hours running time.)
It works well.

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STEAM ENGINES of all kinds,**With or without Rider's Patent Variable Cut-off. Boilers,
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AIR COMPRESSORS**are pronounced by the most eminent engineers in the country as a necessity for the practical working
of all Mines, Tunnels, Quarries, &c. The above machinery is the only machinery that has ever done
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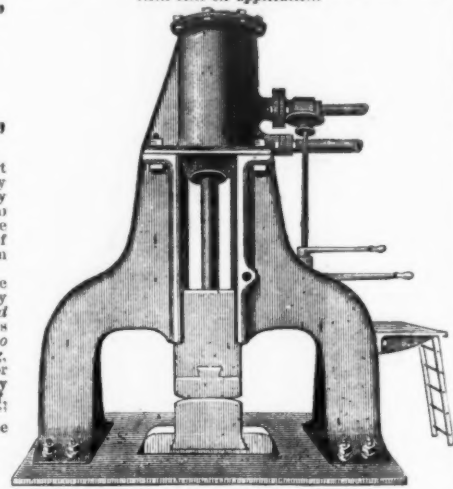
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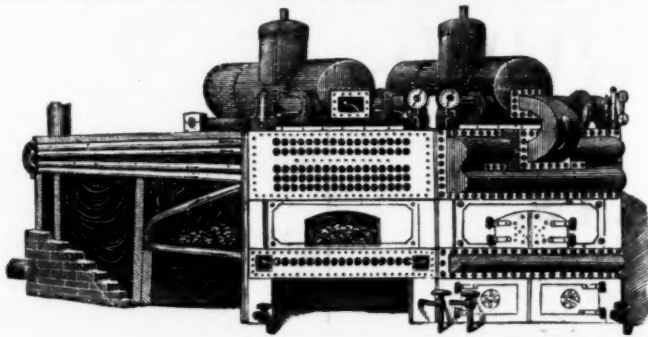
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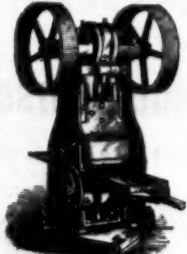
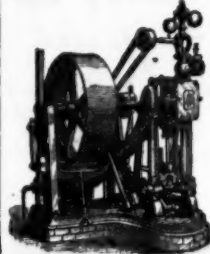
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